Date:

21 January 2000

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: 200 Area Source Characterization - 200-CW-1 Operable Unit Subject: Volatiles - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
BOWBR0	9/14/99	Soil	С	See note 1 & 2
BOWBR1	9/14/99	Soil	С	See note 1 & 2
BOWBR2	9/14/99	Soil	С	See note 1 & 2
BOWBR4	9/14/99	Soil	С	See note 1 & 2
BOWBR5	9/15/99	Soil	С	See note 1 & 2
BOWBR6	9/15/99	Soil	С	See note 1 & 2
BOWBR7	9/15/99	Soil	С	See note 1 & 2
BOWBR8	9/15/99	Soil	C_	See note 1 & 2

<sup>1 -</sup> Volatiles by EPA 8260A

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation



<sup>2 -</sup> Alcohols (butanol and ethanol) by 8015B and diesel range organics by 8015B

### **DATA QUALITY OBJECTIVES**

### Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection for VOA, diesel and alcohols. If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

### Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the CRQL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U".

Due to laboratory blank contamination, the acetone result in samples BOWBR5, BOWBR6, BOWBR7 and BOWBR8 were raised to the CRDL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, the 2-butanone result in samples BOWBR5, BOWBR7 and BOWBR8 were raised to the CRDL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

### Accuracy

### Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 47%, the n-propyl alcohol and ethanol results in samples BOWBRO, BOWBR1, BOWBR2 and BOWBR4 were qualified as estimates and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples BOWBRO, BOWBR1, BOWBR2 and BOWBR4 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate recovery results were acceptable.

### Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J".

All other surrogate recovery results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 30% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOWBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the CRDL (if available) to ensure that laboratory detection levels meet the required criteria. The results for chloromethane bormomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone, acetone and 2-hexanone were reported above the CRDL in all undetected samples; and all undetected analytes in samples BOWBRO, BOWBR1, BOWBR6 and BOWBR8. Under the BHI validation SOW, no qualification is required. All other reported detection limits met their CRDL.

### • Completeness

Data package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

### MINOR DEFICIENCIES

Due to a matrix spike recovery of 47%, the n-propyl alcohol and ethanol results in samples BOWBRO, BOWBR1, BOWBR2 and BOWBR4 were qualified as estimates and flagged "J". Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J". Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples BOWBRO, BOWBR1, BOWBR2 and BOWBR4 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U". Due to laboratory blank contamination, the acetone result in samples BOWBR5, BOWBR6, BOWBR7 and BOWBR8 were raised to the CRDL, qualified as undetected and flagged "U". Due to laboratory blank contamination, the 2-butanone result in samples BOWBR5, BOWBR7 and BOWBR8 were raised to the CRDL, qualified as undetected and flagged "U".

The results for chloromethane bormomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone, acetone and 2-hexanone were reported above the CRDL in all undetected samples; and all undetected analytes in samples BOWBRO, BOWBR1, BOWBR6 and BOWBR8. Under the BHI validation SOW, no qualification is required.

#### REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The
   associated concentration is an estimate, but the data are usable for
   decision-making purposes.
- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

### **DATA QUALIFICATION SUMMARY**

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Volatile orgainics	J	BOWBRO, BOWBR1, BOWBR2, BOWBR4	No matrix spike analysis
n-Propyl alcohol, ethanol	J	BOWBRO, BOWBR1, BOWBR2, BOWBR4	MS percent recovery
Methylene chloride	U	All	Blank contamination
Acetone .	U	BOWBR5, BOWBR6, BOWBR7, BOWBR8	Blank contamination
2-Butanone	U	BOWBR5, BOWBR7, BOWBR8	Blank contamination
n-Propyl alcohol, ethanol	J	All	No surrogate analysis

### Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: BECHTEL-HANFORD	•			1														
Laboratory: RECRA LabNet																		
Case;	SDG: HO	534		] .		_			_	_		_	_					
Sample Number	·	BOWBRO		BOWBR1		BOWBR2		80WBR4		BOWBR5		BOWBR6		BOWBR7	_	BOWBR8		
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758		
Remarks									_			]		Duplicate	Duplicate			
Sample Date		09/14/99		09/14/99 09/14/99 0		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99				
Analysis Date		09/23/99		09/23/99		09/23/99		09/23/99		09/28/99		09/28/99		09/28/99		09/29/99		
VOA/Alcohols/Diesel	CRQL	Result	Q.	Result	Q	Result Q	ļ	Result	Q.	Result	Q	Result	Q	Result	Œ	Result	O.	
Chioromethane	5	11	UJ_	11	3	10 U.	J_	10	IJ	10	U	11	U	10	U _	11	U	
Bromomethane	5	11	υJ	11	IJ	10 U.	J	10	IJ	10	U	11	U	10	U	11	U	
Vinyl Chloride	5	11	υJ	11	UJ	10 U.	J	10	IJ	10	U	11	υ	10	U	11	U	
Chloroethane	5	11	บม	11	3	10 U.	J	10	UJ	10	υ	11	υ	10	υ	11	U .	
Methylene Chioride	5	12	υJ	10	IJ	7 U.	J	9	ÜJ	12	U	15	U	15	U	12	<u>U</u>	
Acetone	10	11	บว	11	IJ	10 U.	J	10	_	10		10	U	10	U	10	U	
Carbon Disulfide		6	บม	6	IJ	5 U.	J	5	UJ	5	U	6	U	5	U	6	ប	
1,1-Dichloroethene	5		w	6	IJ	5 U.	J	5	บม	5	U	6	υ	5	U	6	U	
1,1-Dichloroethana	5	6	IJ	6	IJ	5 U.	J	5	ŲĴ	5	U	.6	υ	5	U	6	U_U	
1,2-Dichloroethene (total)	5	6	IJ	6	UJ	5 U.		5			U	6	U	+	U	6	+	
Chloroform	5	6	υJ	6	UJ	5 U.	J	5			U	6	U	5	U	_ 6	U	
1,2-Dichloroethane	5	6	w	6	UJ	5 U.	<u></u>	5			U	6_	υ	5	U	6	+	
2-Butanone	10	6	J	_6	J	4 J	_	5		<u> </u>	U	11	υ.		υ	10	-	
1,1,1-Trichloroethane	5	6	ÜΊ	6	UJ	5 JL	J	5		5	U	6	U	5	_	6	U	
Carbon Tetrachloride	5	6	υJ		UJ	5 U.	J	5		<del></del>	U	6	υ	5	-	6	+	
Bromodichloromethane .	5	6_	υJ	6	IJ	5 U.		5			U		υ	5		6	+	
1,2-Dichloropropane	5	6	υJ		บุว	5 U.	$\overline{}$	5			U	6	U	5	υ	6		
cis-1,3-Dichloropropene	5	6	IJ	6	UJ	5 U.		5			<u>U</u>	6	U	5	U_	<del></del>	<del> </del>	
Trichloroethene	_ 5	6	UJ	<del></del>	UJ	5 U.	_	5			U_	6	U		U	6	-	
Dibromochloromethane	_ 5	6	IJ	6	UJ	5 U.	-	5		5		6	υ	5		6		
1,1,2-Trichloroethane	5	6	IJ	6	UJ	5 U.	$\overline{}$	5		اـــــــــــــــــــــــــــــــــــــ	<u>U_</u> _	6	U	<del></del>	U	6	U	
Benzene	5	2	J		IJ	5 U.		5			<u>U</u>	6	U		U	<del></del>	U	
trans-1,3-Dichloropropene	5	6	UJ		UJ	5 U.		5		-	U_	6	U	+	U	<del></del>	U	
Bromoform	5	6	UJ_		IJ	5 U.	_		UJ		U	6	U	<del>                                     </del>	U	6	U	
4-Methyl-2-pentanone	5	11	IJ		υJ	10 U.			IJ	<del>                                     </del>	<u>u</u>	11	υ	10		11	U	
2-Hexanone	5	11	υJ	<del></del>	UJ .	10 U.		10	_	10	U	11	U	<del>  '`</del>	U	11	+	
Tetrachloroethene	5	6	υJ	<del></del>	UJ	_5 U.	•		UJ	5	U	6	U	<b>-</b>	U	6	+	
1,1,2,2-Tetrachloroethane	. 5	6	IJ	<del></del>	IJ	5 U.	$\rightarrow$		UJ		U	6	U	+	U	6	U	
Toluene	5	1	J		UJ	5 U.		5_		5	U_	- 6	U	<del></del>	U		$\overline{}$	
Chlorobenzene	5	6	IJ		UJ	5 U.	-	5		5	U	6	U		U	6	+	
Ethylbenzene	5	6	บม	<del></del>	UJ	5 U.		5			U	6	υ	+	U	6	U	
Styrene		6	UJ		ບປ	5 U.	_	5			<u>u_</u> _	6	U .	+	U	6	U	
Xylenes (total)	5	6	IJ		UJ	5 U.	$\overline{}$	5		·	U	6	U	+	U	6	U	
n-Propyl Alcohol		5.5	UJ_	5.0	_	4.4 U	J	4.4		4.9		5.0		4.6		5.0	-	
Ethanol		<b>5</b> .5	บป	5.0	υJ	4.4 U.	J	4.4		4.9		5.0		4.6	υJ	5.0	+	
Diesel Range Organics	5	4.3	U	4.2	U	4.1 U		4.1	U	4.0	U	4.2	U	4.2	U	4.4	Ų	

Volatiles by GC/MS, HSL List

Report Date: 10/22/99 04:55 RFW Batch Number: 9909L129 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1a Cust ID: BOWBR0 BOWBR1 BOWBR4 BOWBR2 **VBLKSQ** Sample RFW#: 001 002 003 004 99LVH366-MB1 Information Matrix: SOIL SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 0.962 1.00 1.00 Units: UG/KG UG/KG UG/KG UG/KG UG/KG

•	_		- •			,	_	,	_	
Surrogate Bromofluorobenzene	98 89	* *	109 % 101 %	98 91	₹ *	98	* *	98	* *	 
Recovery 1,2-Dichloroethane-d4	104	s k	101 f	100	*	88 99	*	92 103	*	
Recovery 1,2-Dichioroechane-da	<del>-</del>	-	117 6 (Tabanananananananananananananananananana		. •		5 e≖fl≖	<del>-</del>	_	 =====f]
Chloromethane	11	U -	11 U	J 10		J 10		J 10	U	 
Bromomethane	11	υ	ט וו	\ 10		1 10	U	10	U	
Vinyl Chloride	11	U	11 0	10	Ü	10	U	10	Ū	
Chloroothano	11	Ū	11 U	10	ប	10	U	10	U	
Methylene ChlorideAcetone	12	Ŕυ	10 %	3 7	<b>∌</b> ()	9	BU	3	J	
Acetone	11	໌ ບ	11 U	10	ับ	10	U	10	U	
Carbon Disulfide	6	Ū	6 U	5	Ū	5	U	5	U	
1,1-Dichloroethene 1,1-Dichloroethane	6	ប	6 0	5	U	5	U	5	U	•
1,1-Dichloroethane	6	U	6 U	1 5	U	5	U	5	U	
1,2-Dichloroethene (total);	6	U.	6 U	5	Ū	5	U	5	U	
Chloroform	6	U	6. U	5	Ü	5	U	5	Ū	
Chloroform	6	Ū	6 U	5	Ū	5	Ū	5	Ū	•
2-Butanone	6	Be	6 🕊	4	J	5	The .	10	Ū	₩.
1,1,1-Trichloroethane	6	ับ	6 Ü	\ 5	U	5	ับ	5	U	
Carbon Tetrachloride	6	U	) 6 U	5	Ū	1 5	U	5	U	
Bromodichloromethane	6	ប	6 U	5	ซ	- 5	U	5	U	
1,2-Dichloropropane	. 6	U	6 0	5	U	<b>{</b> 5	U	5	U	•
cis-1,3-Dichloropropene	6	U	6 U	5	U	5	U ·	5	U	
Trichloroethene	. 6	U	6 U	5	U	5	บ	5	U	
Dibromochloromethane	6	U	6 U	5	U '	5	U	5	บ	
1,1,2-Trichloroethane	6	Ū	6 U	5	Ü	5	U	5	U	
Benzene	2	K	6 U	5	· U	J 5	U	5	U	
Trans-1,3-Dichloropropene	6	U	6 U	. 5	Ü	l 5	Ū	5	U	
Bromoform	6	Ū	6 U	5	U	5	U .	5	U	
4-Methyl-2-pentanone	11	U	· 11 U	10	U	10	U.	10	U	
2-Hexanone	11	U	11 U	10	U	10	U	3	J	
Tetrachloroethene	6	U	∫ 6 U	5	Ū	5	U	5	U -	
1,1,2,2-Tetrachloroethane	6	U	6 U	5	Ū	, 5	U	5	U	•
Toluene	1	<b>/</b>	/ 6 U	<b>V</b> 5	ט י	, <u> </u>	υV	7 5	Ū	
*= Outside of EPA CLP QC limits.	_ •	, u	_	4		•		_		

RFW Batch Number: 9909L129 Cl:	ent: TNU-HANFO	RD B99-078	Work Order:	1098500100	1 Page: 1b
Cust ID:	BOWBRO	BOWBR1	BOWBR2	BOWBR4	VBLKSQ
RFW#:	001	002	003	004	99LVH366-MB1
Chlorobenzene	6 U J	6 U J	5 U Ĵ	5 U	J 5 U
Ethylbenzene	6 U	6 U	5 U \	5 U.	\ 5 U
Styrene	6 U	6 U ,	5 U .	5 U	_{, _ 5 σ `
Xylene (total)	6 U U	′ 6 U <b>V</b>	5 U	5 U	- VI 5 U
*= Outside of BPA CLP QC limits.		•			



Client: TNU-HANFORD B99-078

RFW Batch Number: 9909L127

\*= Outside of EPA CLP QC limits.

Volatiles by GC/MS, HSL List

Cust ID: **BOWBRS** BOWBR5 BOWER7 BOWBR7 BOWBR7 BOWBR6 Sample RFW#: 001 002 003 004 004 MS 004 MSD SOIL Information Matrix: SOIL SOIL SOIL SOIL SOIL D.F.: 1.02 0.980 0.980 0.980 0.980 1.00 Units: UG/KG UG/KG UG/KG UG/KG UG/KG UG/KG Toluene-d8 109 108 ¥ 109 108 106 106 95 Surrogate Bromofluorobenzene 96 99 ¥ 95 ş 97 \$ 95 ş 118 115 120 117 ¥ Recovery 1,2-Dichloroethane-d4 118 118 =====fl IJ 11 TT 11 10 IJ 10 IJ Chloromethane 11 10 10 U Bromomethane 11 10 TT 11 II Ħ 10 IJ 10 Vinyl Chloride 10 U 10 U 10 U 10 ij 11 II 11 11 U Ħ Ħ 10 U 10 [ 11 IJ 10 Chloroethane 15 AU 12 1/80 12 /2U В Methylene Chloride 10 IDA TA 16 A JB WAS JB BJ ZJ Acetone 6 Ū U IJ Ħ Carbon Disulfide 6 U IJ Ħ п 11 93 C1.1-Dichloroethene U IJ C1,1-Dichloroethane П П C1,2-Dichloroethene (total) Ħ U FT П 6 6 П Ħ [] Chloroform 1,2-Dichloroethane\_\_\_\_ U TT · U II 2-Butanone\_\_\_\_ 10° U 10 æ 11 U IJ Ħ 1,1,1-Trichloroethane U U U U U Carbon Tetrachloride U U IJ Bromodichloromethane П U П 1,2-Dichloropropane 5 U U U U cis-1,3-Dichloropropene \_\_\_\_ 108 U 106 Trichloroethene Ħ U U Dibromochloromethane IJ U 5 U 1,1,2-Trichloroethane\_\_\_\_\_ 114 115 U Benzene IJ Trans-1,3-Dichloropropene 11 U П 6 Bromoform U . 10 U 10 10 11 11 U 4-Methyl-2-pentanone U U 11 U 2-Hexanone U U IJ Tetrachloroethene u U 1,1,2,2-Tetrachloroethane U П IJ 117 117 U Toluene

Mercine

Report Date: 10/22/99 16:31

Work Order: 10985001001 Page: 1a

RFW Batch Number: 99	009L127 Clie	nt: TNU-HANFOR	ED B99-078	Work Order:	10985001001	Page: 1b	Ľ
	Cust ID:	BOWBR8	BOWBR5	BOWBR6	BOWBR7	BOWBR7	BOWBR7
	RFW#:	001	002	003	004	004 MS	004 MSD
Chlorobenzene	<u> </u>	6 U	5 Ü	6 U	5 U	106 %	107 %
Ethylbenzene		6 U	5 U	6 U	5 U	์ 5 บั	5, U
Styrene		6 U	5 Ü	6 U	5 U	5 U	5 U
Xylene (total)		6 U	5 U	·6 U	5 U	5 U	5 U

<sup>\*=</sup> Outside of EPA CLP QC limits.

a/n/a

Volatiles by GC/MS, HSL List

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2a

Cu	st ID:	VBLKTP		VBLKTP BS	1	VBLKTO			
Sample	RFW#:	99LVN318-	MB1	99LVN318-	MB1	99LVN316-1	MB1		·
Information M	atrix:	SOIL	,	SOIL		SOIL			•
•	D.F.:	1.	00	1.	00	1.0	00		
•	Units:	UG/	KG	UG/	KG	UG/I	KG		
						<u> </u>			
•	ene-d8	104	ક	102	४	106	¥		
Surrogate Bromofluorob	enzene	97	ક્ષ	96	ક્ષ	99	ક્ષ		•
Recovery 1,2-Dichloroeth	ane-d4	112	ક	118	ક	112	¥	;	
			==f]	-				l======fl==:	
Chloromethane		_ 10	-	10	-	10	U		
Bromomethane		_ 10	_	10	_	1,0	U		
vinyi Chioride	•	_	_	10	U	10	U		
Chloroethane		_ 10	U	10	_	10	U	•	
Methylene Chloride		_ 6		_	JB	3	J		
Acetone			_	1	JB	4	J		
Carbon Disulfide			-	5	Ū	5	U		• *
1,1-Dichloroethene		_	U	93	ક્ષ	. 5	U		
1,1-Dichloroethane	!	_ 5	U	5	U	5	U	•	
1,2-Dichloroethene (total)_	:	_ 5	U	5	U	5	Ū		
Chloroform		_ 5	Ü	5	U	5	Ü		
1,2-Dichloroethane	<u>!.</u>	_ 5	U	5	U	5	U		
2-Butanone		_ 2	J	10	Ω	· 1	J		· •
1,1,1-Trichloroethane		. 5	U	. 5	U	5	Ū		
Carbon Tetrachloride		. 5	U	. 5	Ü	5	U		
### Promodichloromethane	*.	. 5	U	5	U	5	U	•	
1,2-Dichloropropane		. 5	U	5	U	5	U		
cis-1,3-Dichloropropene	<u> </u>	. 5	U	5	Ū	5	Ū		<i>1</i> 2
Trichloroethene		. 5	U	104	ક	5	U	.A	1/4/00
Dibromochloromethane		. 5	U	. 5	U	5	U	اله ود ليه	
1,1,2-Trichloroethane	·	. 5	U	5	U	5	Ū	1,2,7	14/
Benzene		5	U	112	ક્ષ	5	U	• •	´ 30
Trans-1,3-Dichloropropene		5	U	5	U	- 5	U		•
Bromoform		5	Ū	5	U	5	U		
4-Methyl-2-pentanone		10	U	10	U	10	U	·	
2-Hexanone		10	U	10	U	10	U		•.
Tetrachloroethene		5	U	5	U	5	U		
1,1,2,2-Tetrachloroethane		5	U	5	U	5	U		•
Toluene		5	U	110	ł	5	U		•

\*= Outside of EPA CLP QC limits.

	Cust ID:	VBLKTP		VBLKTP BS		VBLKTO		٠,٠
	RFW#:	99LVN318-1	MB1	99LVN318-1	Æ1	99LVN316-M	<b>B</b> 1	
Chlorobenzene		5	U	104	*	. 5	Ū	
Ethylbenzene		5	U	5	U	5	U	
Styrene		5	Ū	· 5	U	5	U	•
Xylene (total)	!	5	IJ	5	U	5	υ	

<sup>\*=</sup> Outside of EPA CLP QC limits.

/1/4/00

Report Date: 10/04/99 12:49 GC SCAN Work Order: 10985-001-001-9999-00 Client: TNU-HANFORD B99-078 RFW Batch Number: 9909L129

•	Cust ID:	BOWBRO	BOWBRO	BOWBRO	BOWBR1	BOWBR2	BOWBR4
Sample Information	RFW#: Matrix: D.F.: Units:	001 SOIL 1.00 mg/kg	001 MS SOIL 1.00 mg/kg	001 MSD SOIL 1.00 mg/kg	002 SOIL 1.00 mg/kg	003 SOIL 1.00 mg/kg	004 SOIL 1.00 mg/kg
= 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		fl	***********fl=*	fl		fl	fl
n-Propyl Alcohol		5.5 U J	47 * *	53 %	5.0 UJ	4.4 UJ	4.4 U J
Ethanol		₹۵ 5.5	5.5 U	5.0 U	5.0 UJ	4.4 ت آ−	4.4 UJ
		-			•		
·	Cust ID:	BLK	BLK BS				<del></del>
*			BLK BS			·	· · · · · · · · · · · · · · · · · · ·
Sample					·		
Sample	RFW#:	99LLC143-MB1 99	LLC143-MB1				
Sample	RFW#: Matrix:	99LLC143-MB1 99 SOIL	SOIL		· · · · · · · · · · · · · · · · · · ·		
Sample Information	RFW#: Matrix: D.F.:	99LLC143-MB1 99 SOIL 1.00 mg/kg	SOIL 1.00	fl	fl		f1
Sample Information  n-Propyl Alcohol	RFW#: Matrix: D.F.:	99LLC143-MB1 99 SOIL 1.00 mg/kg	SOIL 1.00 mg/kg	fl	·	fl	fl

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. \*= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

GC SCAN

Report Date: 10/04/99 12:45 Work Order: 10985-001-001-9999-00 Page: 1 Client: TNU-HANFORD B99-078 RFW Batch Number: 9909L127 BOWBR7 BOWBR6 BOWBR8 BOWBR5  $\alpha$ BOWBR8 BOWBR8 Cust ID: 003 004 002 001 MSD RFW#: 001 001 MS Sample SOIL SOIL SOIL SOIL SOIL SOIL Information Matrix: 1.00 1.00 1.00 1.00 D.F.: 1.00 1.00 mg/kg mq/kq mq/kg mq/kg Units: mg/kg mg/kg 4.6 U J 4.9 U J 5.0 UJ 110 5.0 UJ 115 n-Propyl Alcohol 4.6 UJ 4.9 U J 5.0 UJ 5.0 U.T 5.5 U 5.0 U Ethanol Cust ID: BLK BLK BS RFW#: 99LLC143-MB1 99LLC143-MB1 Sample SOIL SOIL Information Matrix: D.F.: 1.00 1.00 Units: mq/kg mg/kg n-Propyl Alcohol 5.0 U 89 % Ethanol 5.0 U 5.0 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. \*= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

10/4/91/11

000019

DIESEL RANGE ORGANICS BY GC

Report Date: 10/14/99 09:35

Work Order: 10985-001-001-9999-00 RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 BOWBR6 BOWBR7 BOWBR8 BOWBR5 Cust ID: BOWBR8 BOWBR8 001 MS 001 MSD 002 003 004 Sample 001 RFW#: SOIL SOIL SOIL SOIL SOIL SOIL Information Matrix: 1.00 D.F.: 1.00 1.00 1.00 . 1.00 1.00 mg/kg mg/kg mg/kg mg/kg mg/kg Units: mg/kg .78 p-Terphenyl 119 % 109 % 97 % 101 % Surrogate: 4.0 U 4.2 U 4.2 U 108 91 4.4 U Diesel Range Organics BLK BS Cust ID: BLK Sample RFW#: 99LE1153-MB1 99LE1153-MB1 Information Matrix: SOIL SOIL 1.00 D.F.: 1.00 Units: mg/kg mg/kg 97 % Surrogate: p-Terphenyl 94 % Diesel Range Organics 4.0 U 93 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
The Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

Re-

000020

DIESEL RANGE ORGANICS BY GC

Report Date: 10/12/99 13:16

Cust ID:	BOW	BR0	BOWBE	10	BOWER	0	BOWBR		BOWBR2		BOWBR	<b>4</b> ດ
RFW#:			001 M	ıs		•		· ·		· •	004	4 5
					SOIL							
D.F.:		1.00	1.	00	1.0	00						
Units:	wč	g/kg	mg/	'kg	mg/l	kg	mg/k	g	mg/k	:g	mg/k	rā
-Terphenyl	104	4 }	115	ŧ	99	*	95	*	104	š	100	¥
		£]	.========	fl		fl		-fl		=fl====		fl
	_ 4.	3 0	79	. *	75	* .	4.2	Ū	4.1	U	4.1	U
Cust ID:	BLK	ļ	BLK BS					<u></u>		<del>.</del>		
RFW#:	99LE1153	-MB1	99LE1153-	MB1	•							
Matrix:	SOI	L	SOIL									
D.F.:	بر .	.00	1.	00								
Units:	mg	i/kg	mg/l	kg	·							•
Terphenyl	97		94	ł			· •-					
	4	: -				eflee:		=fl==:		=fl====	*====	≔fl
	Matrix: D.F.: Units: -Terphenyl  Cust ID: RFW#: Matrix: D.F.: Units:	Matrix: SO. D.F.: Units: mc  Terphenyl 104  4.  Cust ID: BLK  RFW#: 99LE1153  Matrix: SOI D.F.: Units: mc  Terphenyl 97	Matrix: SOIL D.F.: 1.00 Units: mg/kg  Terphenyl 104 *  4.3 U  Cust ID: BLK  RFW#: 99LE1153-MB1 Matrix: SOIL D.F.: 1.00 Units: mg/kg  Terphenyl 97 *  Terphenyl 97 *	Matrix: SOIL SOIL D.F.: 1.00 1. Units: mg/kg mg/  Terphenyl 104 115  4.3 U 79  Cust ID: BLK BLK BS  RFW#: 99LE1153-MB1 99LE1153- Matrix: SOIL SOIL D.F.: 1.00 1. Units: mg/kg mg/  Terphenyl 97 1 94  Terphenyl 97 2 94	Matrix: SOIL SOIL D.F.: 1.00 1.00 Units: mg/kg mg/kg  Terphenyl 104 % 115 %  A 3 U 79 %  Cust ID: BLK BLK BS  RFW#: 99LE1153-MB1 99LE1153-MB1 Matrix: SOIL SOIL D.F.: 1.00 1.00 Units: mg/kg mg/kg  Terphenyl 97 % 94 %  Terphenyl 97 % 94 %	Matrix: SOIL SOIL SOIL D.F.: 1.00 1.00 1. Units: mg/kg mg/kg mg/ -Terphenyl 104 % 115 % 99	Matrix: SOIL SOIL SOIL  D.F.: 1.00 1.00 1.00 mg/kg mg/kg  Terphenyl 104 % 115 % 99 %  -Terphenyl 99 % 75 %  Cust ID: BLK BLK BS  RFW#: 99LE1153-MB1 99LE1153-MB1  Matrix: SOIL SOIL  D.F.: 1.00 1.00  Units: mg/kg mg/kg  -Terphenyl 97 % 94 %  -Terphenyl 97 % 94 %	Matrix: SOIL SOIL SOIL SOIL  D.F.: 1.00 1.00 1.00 1.00  Units: mg/kg mg/kg mg/kg mg/kg mg/k  -Terphenyl 104 % 115 % 99 % 95	Matrix: SOIL SOIL SOIL SOIL  D.F.: 1.00 1.00 1.00 1.00 1.00  Units: mg/kg mg/kg mg/kg mg/kg  Terphenyl 104 % 115 % 99 % 95 %  fl f	Matrix: SOIL SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/k  Terphenyl 104 % 115 % 99 % 95 % 104  4.3 U 79 % 75 % 4.2 U 4.1  Cust ID: BLK BLK BS  RFW#: 99LE1153-MB1 99LE1153-MB1 Matrix: SOIL SOIL D.F.: 1.00 1.00 Units: mg/kg mg/kg  Terphenyl 97 % 94 %	Matrix: SOIL SOIL SOIL SOIL SOIL SOIL  D.F.: 1.00 1.00 1.00 1.00 1.00 1.00  Units: mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg  Terphenyl 104 % 115 % 99 % 95 % 104 %	Matrix: SOIL SOIL SOIL SOIL SOIL SOIL SOIL  D.F.: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of Advisory limits.

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### Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Chemical and Environmental Measurement Information Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW #: 9909L129

SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00

Date Received: 09-17-99

#### GC/MS VOLATILE

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-23-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- The cooler temperature upon receipt has been recorded on the chain-of-custody. 1.
- 2. The required holding time for analysis was met.
- 3. Non-target compounds were not detected in the samples.
- 4. All surrogate recoveries were within EPA QC limits.
- Matrix spike analyses for SDG H0534 were performed on RFW# 9909L127, sample ID-5. BOWBR7.
- The method blank contained the common laboratory contaminant Methylene Chloride and the 6. target compound 2-Butanone at levels less than the CRQL.

Vice President

Philadelphia Analytical Laboratory

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01-18-00 Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are

integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.



## Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW#: 9909L127

SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00

Date Received: 09-17-99

### GC/MS VOLATILE

Four (4) soil samples were collected on 09-15-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-28,29-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding time for analysis was met.
- 3. A non-target compound was detected in sample B0WBR6.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. All matrix spike recoveries were within EPA QC limits.
- 6. All blank spike recoveries were within EPA QC limits.
- 7. The method blanks contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CRQL and the target compound 2-Butanone at levels less than the CRQL.

for St D Wester

J. Michael Taylor
Vice President

Philadelphia Analytical Laboratory

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Date

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# Recra LabNet Philadelphia Analytical Report \*\*REVISION\*\*

Client: TNU HANFORD B99-078

RFW #: 9909L127

SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00

Date Received: 09-17-99

#### GC SCAN

This narrative was revised to remove references to Butanol and add references to 1-Propanol and to clarify surrogate information.

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and 1-Propanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding time for analysis was met.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.
- 6. The blank spike recovery was within advisory control limits of 50%-150%.
- 7. All matrix spike recoveries were within advisory control limits of 50%-150%.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

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01+03-00 Date

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the emplyical data. Therefore, this report should only be reproduced in an emirgip of  $\mathcal{F}_{i}$  pages

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## Recra LabNet Philadelphia Analytical Report

Client: TNU HANFORD B99-078

RFW #: 9909L129

SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00

DEC 1990

Date Received: 09-17-99

GC SCAN

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and Butanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding time for analysis was met.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Surrogates were not used for this analysis.
- 6. The blank spike recovery was within advisory control limits of 50%-150%.
- 7. One (1) of two (2) matrix spike recoveries was outside the advisory control limits of 50%-150%.

J. Michael Taylor Vice President

Philadelphia Analytical Laboratory

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10-15-99 Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 6 pages.

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## Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW#: 9909L129

SDG/SAF#: H0534/B99-078

W.O #: 10985-001-001-9999-00

Date Received: 09-17-99

#### DIESEL RANGE ORGANICS

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were prepared on 09-22-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 10-07,08-99. The analysis met the intent of method WTPH-D.

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for extraction and analysis were met.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. The blank spike recovery was within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

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10-19-99 Date

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## Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078 W.O #: 10985-001-001-9999-00

Date Received: 09-17-99

**DFC 1999** 

Data Log In

SDG/SAF#: H0534/B99-078

RFW#: 9909L127

### **DIESEL RANGE ORGANICS**

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-22-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 10-07-99. The analysis met the intent of method WTPH-D.

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for extraction and analysis were met.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. All blank spike recoveries were within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-19-98 Date

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000028

Disposed By

Date/Time

FINAL SAMPLE Disposal Method

Disposed By

Date/Time

FINAL SAMPLE Disposal Method

Appendix 5

**Data Validation Supporting Documentation** 

### GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	А	В	(C)	D	E
PROJECT: 2	00-66-1	XX	DATA PACKAGE	: Hos34	
VALIDATOR:	TLI	LAB: Rec		DATE: /2/	20/89
CASE:			SDG: HOS	34	
		ANALYSES	PERFORMED		
CLP Volatiles	SW-846 8240 (cap column)	SW-846 8260 (packed column)	CLP Semivolatiles	SW-846 8270 (cap column)	SW-846 (packed column)
		Ò			
SAMPLES/MATE	RIX (BOW)	3RO Bou	BRI BO	on BR S	BOWBRY
	BOWBR			BR7 BO	พหเรร
					501
Is technical	KAGE COMPLETEN verification rrative presen	documentation			Yes No N/A Yes No N/A
2. HOLDING	TIMÉS				
	olding times	acceptable?		/	Yes No N/A
		· · · · · · · · · · · · · · · · · · ·		·	
				· -	
		·			

### GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION
Is the GC/MS tuning/performance check acceptable? Yes No ( N/A)
Are initial calibrations acceptable? Yes No \ N/A
Are continuing calibrations acceptable? Yes No $N/A$
Comments:
4. BLANKS
Were laboratory blanks analyzed? Nes No N/A
Are laboratory blank results acceptable? Yes No N/A
Were field/trip blanks analyzed? Yes No N/A
Are field/trip blank results acceptable? Yes No (N/A)
Comments: 0 >0,12 - methylane Chlorile - U 2,4 +cx
- 5, 4, 78 - 11 11 - 0 cm/y
Benne 12 to tolven - Pt, Ro arelan - R5, 6, 7,8 - U toc
7 butome - Store S, 7, 8 - O at CROL
5. ACCURACY
Were surrogates/System Monitoring Compounds analyzed? Yes No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Yes No N/A
Were MS/MSD samples analyzed? Yes No N/A
Are MS/MSD results acceptable? Yes No N/A
Comments: Ranks/USD (BRO-4)
OK for 6-8- NO USD J (0-4)

### GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION
Are MS/MSD RPD values acceptable?
Are field duplicate RPD values acceptable? Yes No N/A
Are field split RPD values acceptable? Yes No NA
Comments: M3/M3D of OK Sor 5-8_
1k_
7. SYSTEM PERFORMANCE
Were internal standards analyzed? Yes No /N/A
Are internal standard areas acceptable? Yes No N/A
Are internal standard retention times acceptable? Yes No N/A
8. COMPOUND IDENTIFICATION AND QUANTITATION
Is compound identification acceptable? Yes No
Is compound quantitation acceptable? Yes No No Comments:
9. REPORTED RESULTS AND QUANTITATION LIMITS
Are results reported for all requested analyses?
Are all results supported in the raw data? Yes No
Do results meet the CRQLs? Yes (No) N/
Has the laboratory properly identified and coded all TIC? Yes No
Comments: Chlorometry - RO, RI, RG, R8 Bromomethe RO, RI, RG, R8
Vingloblorich, chloroeth - RO, RI, RC, Aretar- RO, RI
4 meth/2 pentine + 2 Herenas RO, RIRG, RR 2- Surance DRG

### GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(i)	ם	E		
PROJECT: 200-CW-			DATA PACKAGE: HOS34				
VALIDATOR:	TU	LAB: Re	CRA	DATE: )2/3	20 99		
CASE:			SDG: 140534				
alcolol ANALYSES PERFORMED							
□ 801 <b>0</b>	8015	□ 802 <b>0</b>	□ 8021	8140	8141		
□ 8150	8151	□ WTPH-HCID	□ WTPH-G	. □ WТРН-D	0		
Ö	0	0	0	0	0		
SAMPLES/MATRIX: BOWBRO BOWBRI BOWBRZ BOWBRZ							
	BOWBR5	Bowse	Re Bow	BR7 BO	WBR8		
<del>-</del>							
					sail		
1. DATA PACI	KAGE COMPLETEN	NESS AND CASE	NARRATIVE				
Is technical	verification	documentation	n present? .		Yes No NA		
Is a case nat	rrative presem	nt?	• • • • • •	• • • • • • (	Yes No N/A		
Comments:				•			
		···········					
				•	<del></del>		
			<del></del>		-		
2. HOLDING	TTHES				· · · · · · · · · · · · · · · · · · ·		
	olding times	accentahle?			Yes No N/A		
					100 1.7.1		
					· · · · · · · · · · · · · · · · · · ·		
				<u> </u>			
					<u></u>		
	<del></del> -				•		

# GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION		
3.1 INITIAL CALIBRATION		$\bigcirc$
Was an initial calibration performed?	Yes	No (N/)
Are %RSD values for calibration or response factors acceptable?	Yes	No NA
Comments:		
		<u> </u>
3.2 CONTINUING CALIBRATION		
Was a continuing calibration check performed?	Yes	No (N/A)
Are %D values for calibration or response factors acceptabl		No AYA
Comments:		
		<del>_</del>
· ·		
4. BLANKS	(Va)	) No. 11/A
Were laboratory blanks analyzed?	77	No N/A
Are laboratory blank results acceptable?		71
Were field/trip blanks analyzed?		No N/A
Are field/trip blank results acceptable?	Yes	No N/A
Collinearry:		
	•	
	· <del></del>	
5. ACCURACY		
Were surrogates analyzed?	Yes	No N/A
Are surrogate recoveries acceptable?	Yes	N/A
Were MS/MSD samples analyzed?	(Yes	No N/A
Are MS/MSD recoveries acceptable?	Yes	No N/A
Were LCS samples analyzed?	Yes	No N/A
Are LCS recoveries acceptable?	Yes	No NA

ATA

# GENERAL GC DATA VALIDATION CHECKLIST

Comments: Svyveyed IR	
N-propy 1 - 479. I 0,1,2,4	 
6. PRECISION  Are MS/MSD sample RPD values acceptable?	N/A N/A N/A
7. COMPOUND IDENTIFICATION AND QUANTITATION  Is compound identification acceptable?	N/A N/A
8. REPORTED RESULTS AND DETECTION LIMITS  Are results reported for all requested analyses?	

A-12-7

## GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(0)	D	E
PROJECT: 2	00-CW-	1	DATA PACKAGE	result :	
VALIDATOR:	TU	LAB: Re	crt	DATE: 12/2	ı
CASE:			SDG: 14-0	·534	
<u>.</u>	Diesel	ANALYSES	PERFORMED		
□ 801 <b>0</b>	8015	□ 802 <b>0</b>	□ 8021	8140	8141
□ 8150	8151	□ WTPH-HCID	□ WТРН-G	. D WTPH-D	0
ם	0	0		0	0
SAMPLES/MATE	RIX: BOW	BRO E	Zowbri	BOWBRZ	BOWBRY
	·		6 BOW	*	wgP8
		·			
					1
1. DATA PACK	AGE COMPLETEN	IFSS AND CASE	NARRATIVE		_
			present? .		res No N/A
•	rative preser				
			• • • • • •		(es) No N/A
Comments:		<del></del>		<u> </u>	
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			<del></del>		,
2. HOLDING	TIMES				
		accentable?		7.	Yes No N/A
				• • • • • • • • • • • • • • • • • • • •	10 11/4
COMMENTS :				<del></del>	
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A102 000039

# GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION			
3.1 INITIAL CALIBRATION			
Was an initial calibration performed?	. Yes	No	M/A
Are %RSD values for calibration or response factors acceptable?		No	N/A
Comments:			$\underline{\underline{}}$
	<del></del>		
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· · · · · · · · · · · · · · · · · · ·			
3.2 CONTINUING CALIBRATION		,	
Was a continuing calibration check performed?	. Yes	No /	N/A
Are %D values for calibration or response factors acceptable?	. Yes	No /	N/A
Comments:	<u> </u>		$\stackrel{\smile}{-}$
	· · · · · · · · · · · · · · · · · · ·		<u>-</u>
	<del></del>	<u> </u>	<del></del>
4. BLANKS			
Were laboratory blanks analyzed?	$\sim$	No	N/A
Are laboratory blank results acceptable?	\ \ /	No	N/A
Were field/trip blanks analyzed?	. Yes	No	N/A
Are field/trip blank results acceptable?	. Yes	No	(N/A)
Comments:		<del></del>	
			<del></del> ·
		<u> </u>	
5. ACCURACY		V	
Were surrogates analyzed?	. (Yes)	No	N/A
Are surrogate recoveries acceptable?		. No	N/A
Were MS/MSD samples analyzed?	(AS)	No	N/A
Are MS/MSD recoveries acceptable?	· (Yes)	/ No	N/A
Were LCS samples analyzed?	. Yes	No	(N/A)
Are LCS recoveries acceptable?	. Yes	No	M/A

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# GENERAL GC DATA VALIDATION CHECKLIST

Comme	ents:	Olcoh	J- N	O SULV	<u> J</u>		<del></del>
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	PRECISION						
	MS/MSD sample RPD values accepta		•		<b>-</b>	No	N/A
	field duplicate RPD values accep					No.	MA
	field split RPD values acceptabl	•		• • •	. Yes	No	N/A
Comme	ents:			· <del></del>			
						· · ·	
7. (	COMPOUND IDENTIFICATION AND QUAN	ITITATION					/
s co	ompound identification acceptabl	le?			Yes	No	( N/A
Is co	ompound quantitation acceptable?	?			Yes	No	NN
Comme	ents:		·				
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			·				· · <del>**</del>
8. 1	REPORTED RESULTS AND DETECTION I	LIMITS	,	•			
Are	results reported for all request	ted analyse	s?	• • •	. (Yes)	No	N/A
Are	all results supported in the raw	w data? .			Yes	No	(II)
Do r	results meet the CRQLs?			• • •	Yes	No i	(W)
Comm	ents:						
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Review Comment Record (RCR)				1. Date 2/03/00	2. Revi	iew No. /QA0014		
						3. Project 200-CW-1	4. Pag Pa	ge 1 of 3
5. Doo	cument Number(s)/Title(s)	6. Program/Project/ Building Number	7. R	eviewer		8. Organization/Grou	p 9. 1	Location/Phone
SDG 1	DG No. H0534  200 Area Source Characterization – 200- CW-1 Operable Unit		cey	ВНІ/QА	H0-16/372-9208			
17. Con	nment Submittal Approval:	10. Agreement with indicated	commen	t dispositio	on(s)	11. CLOSED		
Org	anization Manager (Optional)	Date	viewer/Po	oint of Cor	ntact	Date	Reviewer/l	Point of Contact
		Au	thor/Orig	inator			Author/Ori	ginator
12. Item		Provide technical justification for the ation of the action required to correct/idicated.)	1	14. Hold Point	15. Disposi	tion (Provide justification if )	NOT accepted.)	16. Status
	for the qualifiers. The validation p copies data validation supporting d	ackages had the supporting documenta procedures calls to include submittal of locumentation as part of the validation ed hold time information, out of critering S data, etc.	f					
1	the units to be UG/KG. The CRDI	DL to be 0.1 with the heading indicatin for PCB should be 100 UG/KG. Thi that the laboratory exceeded the detect	is					
2		acceptance criteria do not reflect proje RL 99-07.	ect	-				
3	range is 70 to 130%. This should r	acy specifies the matrix spike recovery read matrix spike recovery range is 70 topes determined by GeLi/HPGe recovers to the project documents.	to					
4	Radiochemistry: Page 003, Precisi whereas, project documents has acc	on indicates acceptable RPD to be 359 ceptance for precision to be 30%.	%;					
5	Radiochemistry: page 010 needs a Total U is in MG/KG.	statement at bottom data indicating th	at		<del></del>		*****	

	Review Comment Record (RCR)			1. Date 2/03/00	2. Review No. BHI/QA001	4
				3. Project 200-CW-1	4. Page Page 2 of	3
12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Hold Point	15. Dis	position (Provide justification i	f NOT accepted.)	16. Status
6	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 will need reviewed.					
7	Radiochemistry: Page 001 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-07 draft B.					
8	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.					
9	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.					
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.		_			
11	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.					
12	Volatiles: The detection limits listed on page 011 do not meet the project PQL on the majority of the compounds.					
13	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.					
14	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.					
15	Semi-Volatiles: Page 011 for SDG in the header has H0506, this should be H0534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.					
16	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements. Using the project acceptance criteria for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.					
17	Inorganics: Page 010 the heading at the top of the page indicates the units					

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	Review Comment Record (RCR)			1. Date 2/03/00	2. Review No. BHI/QA001	4
				3. Project 200-CW-1	4. Page Page 3 of	3
12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)  for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.	14. Hold Point	15. Disp	osition (Provide justification in	NOT accepted.)	16. Status
18	Inorganic: Page 010 most of the CRDL listed are not what the project required.					
	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.					

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BHI Sample Management Phone: (509) 372-9346 FAX: (509) 372-9487

# facsimile transmittal

To: Bruce C	Fax: 5-6151	
From: J. Duncan	Date: 2/3/00	
Re: RCRS	Pages:	
CC:		
Quick Turn / Priority Data	□ Final Data Package	

Date:

21 January 2000

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: 200 Area Source Characterization - 200-CW-1 Operable Unit Subject: PCBs - Data Package No. H0534-RLN (SDG No. H0534)

### INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
BOWBRO	9/14/99	Soil	С	PCBs by EPA 8082
BOWBR1	9/14/99	Soil	С	PCBs by EPA 8082
BOWBR2	9/14/99	Soil	С	PCBs by EPA 8082
BOWBR4	9/14/99	Soil	С	PCBs by EPA 8082
BOWBR5	9/15/99	Soil	С	PCBs by EPA 8082
BOWBR6	9/15/99	Soil	С	PCBs by EPA 8082
BOWBR7	9/15/9 <del>9</del>	Soil	С	PCBs by EPA 8082
BOWBR8	9/15/99	Soil	С	PCBs by EPA 8082

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### DATA QUALITY OBJECTIVES

### Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

All holding times were met.

#### Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable.

### Accuracy

### Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike results were acceptable.

### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. The RPD for soil samples is ≤30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOSBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the PQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels were below the analyte specific PQL.

### • Completeness

Data Package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

### **MINOR DEFICIENCIES**

None found.

#### REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The
  associated concentration is an estimate, but the data are usable for
  decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

### DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_			
COMMENTS: No qualifiers assigned						
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON			
	<u> </u>	<u> </u>				
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### Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet				]													
Case	SDG: H	0534		Ì													
Sample Number		BOWBRO	BOWBR1	BOWBR2 B		BOWBR4		BOWBR5		80WBR6		BOWBR7		BOWBR8			
Location		B8758		B8758		B8758		88758		B8758		B8758		B8758		B8758	
Remarks		•												Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
PCB	CRDL	Result	a	Result	a		a		ď	Result	Q.	Result	Q	Result	٥		a
Araclor-1016	100	37	U	35	Ų	34	U	34	J	33	υ	34	U_	35	υ	37	
Aroclor-1221	100	73		71	ادا	68		68	_	67	U	69	_	69		73	_
Aroclor-1232	100	37		35	υ	34	_	34	_	33		34		35		37	_
Aroclor-1242	100	37		35	_	34		34	-	33	_	34		35	_	37	
Aroclor-1248	100	37	υ	35	_	34		34	_	33	_	34	-	35	_	37	_
Aroclor-1254	100	37	_	35		34		34	-	33		34	_	35		37	
Aroclor-1260	100	37	U	35	U	34	٦	34	٥	33	U	34	U	35	U	37	U
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Report Date: 10/12/99 09:51

#### Recra LabNet - Lionville Laboratory

PCBs by GC

Work Order: 10985001001 Page: 1 RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 BOWBR6 BOWBR7 BOWBR8 BOWBR5 Cust ID: BOWBR8 BOWBR8 001 MSD 002 003 004 Sample RFW#: 001 001 MS SOIL SOIL Information SOIL SOIL SOIL SOIL Matrix: 1.00 1.00 1.00 D.F.: 1.00 1.00 1.00 UG/KG UG/KG UG/KG UG/KG Units: UG/KG UG/KG \* 102 Tetrachloro-m-xylene ¥ 110 98 ¥ Surrogate: 102 ł 102 110 98 ł Decachlorobiphenyl 98 ł 99 ł 105 Ł 107 ¥ 98 Ł ====fl 35 U TT Aroclor-1016 IJ 37 U 37 U 33 - 17 34 37 69 U IJ 69 U U 67 Aroclor-1221 73 U 73 U 73 35 U 34 Aroclor-1232 37 U 37 U 37 U 33 U 37 U 33 U [] 35 U 37 U 37 U Aroclor-1242 35 U 34 U 37 U 37 U 37 U 33 U Aroclor-1248 34 U 35 U 33 U Aroclor-1254 37 U 86 85 37 U 37 [] 33 U 34 U 35 U Aroclor-1260 37 U Cust ID: PBLKVF PBLKVF BS Sample RFW#: 99LE1168-MB1 99LE1168-MB1 000011 Information SOIL SOIL' Matrix: DF. 1.00 1.00

Ş	Units:	UG/		UG/I		·
Surrogate:	Tetrachloro-m-xylene	105	*	100	*	
	Decachlorobiphenyl	100	र ==fl=	95	τ ==fl=	======fl======fl=====fl=====fl======fl======
Aroclor-1016	5	33	Ū	33	Ū	
Aroclor-1221	l	67	U	. 67	U	
Aroclor-1232	2	33	U	33	U	P
Aroclor-1242	2	33	U	33	U	AND 1854
Aroclor-1248	3	33	U	33	U	10 le
Aroclor, 1254		33	U	78	¥	<i>∠</i> 0,
Aroclor-1260		33	U	33	U	

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

#### Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 10/12/99 09:48 RFW Batch Number, 49097.124 Work Order, 10085001001 Dage: 1

RFW Batch Number: 9909L129		Client: TNU-HANFORD B99-078				Work Order: 10985001001				<u>001 Page</u>	: 1	•	
	Cust ID:	BOWBI	0	BOWBR	.0	BOWBR	,	BOWBR	i	BOWER	2	BOWBR	14
Sample	RFW#:	00	1	: 001 M	S	001 MS	)	00:	2	. 00	3	. 00	4
Information	Matrix:	SOIL	,	SOIL	1	SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.	00	1.	00	1.0	00	1.0	00	1.	00	1.	00
	Units:	UG/	KG	UG/	KG	UG/I	KG	UG/I	KG	UG/	KG	UG/	KG
Surrogate:	Tetrachloro-m-xylene		*	100	*	105	*	102	*	110	*	92	*
	Decachlorobiphenyl	89	ŧ	93	¥	97	ł	98	*	106	*	91	¥
*********	*****		==f]		fl		-fl		-fl		-fl-		==f]
Aroclor-1016	- المساور في المساور ا	37	U	37	U .	36	U	, <b>3</b> 5	ט	34	Ū	34	
Aroclor-1221		_ 73	Ü	73	U	73	U	71	.U	68	ָ ט	68	
Aroclor-1232		_ 37	Ŭ	37	U	36	U <sub>.</sub>	` 35	U	34	U	34	
Aroclor-1242		_ • . 37	U	37	U	36	U	35	<b>U</b> .	34	Ū	34	
Aroclor-1248		_ 37	U	37	ซ	36	ָ ָ ָ ט	35	U	34	U	34	
		37	U	82	\$	96	ł	35	U	34	U	34	U
Aroclor-1254_		<del>-</del>	U	•	•								
Aroclor-1254_ Aroclor-1260_		_ 37	Ü	37	Ü	36	ប	35	U	34	U	34	
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-		37	_	•	-		U	35	U	34	ט	. 34	
Aroclor-1260	Cust ID:	37	,	37	Ü		U .	35	<b>U</b>	34	ט	. 34	
Aroclor-1260  Sample Information	Cust ID:	PBLKVF	,	PBLKVF BS	Ü		U	35	U	34	<b>U</b>	34	
Aroclor-1260 Sample	Cust ID:	37 PBLKVF 99LE1168-1	vesi	PBLKVF BS	Ü Œ1		υ	35	U	34	<b>U</b>	34	
Sample Information	Cust ID: RFW#: Matrix:	PBLKVF  99LE1168-I SOIL	, <b>681</b>	PBLKVF BS 99LE1168-1	Ü 6 <b>81</b>		U	35	U	34	ט	. 34	
Sample Information	Cust ID:  RFW#:  Matrix:  D.F.:	99LE1168-I SOIL	, <b>681</b>	PBLKVF BS  99LE1168-B  SOIL 1.0	Ü 6 <b>81</b>		U	35	U	34	ט	34	
Sample Inflormation	Cust ID:  RFW#:  Matrix:  D.F.:  Units:	99LE1168-I SOIL 1.0 UG/I	, <b>GB1</b>	PBLKVF BS  99LE1168-B  SOIL  1.0  UG/R	Ü <b>(B1</b> )0 (G		U	35	<b>U</b>	34	<b>U</b>	34	
Aroclor-1260  Sample Inflormation  C L Sample	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-1 SOIL 1.0 UG/I	, was 1.	37  PBLKVF BS  99LE1168-2  SOIL  1.0  UG/R	<b>GB1</b> 00 CG		-fl	-				34	
Sample InDormation C C Aroclor-1016	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-1 SOIL 1.0 UG/I	00 (G	37  PBLKVF BS  99LE1168-2  SOIL  1.0  UG/R	00 (G		-fl	-			=fl==		
Aroclor-1260  Sample InBormation  C  C  Aroclor-1016 Aroclor-1221	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37  PBLKVF  99LE1168-I  SOIL  1.0  UG/I	00 (G	37  PBLKVF BS  99LE1168-1  SOIL  1.0  UG/K	U U U U U U U U U U U U U U U U U U U		-fl	***************************************			=fl==		
Sample Information C C Aroclor-1016 Aroclor-1221 Aroclor-1232	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-1 SOIL 1.0 UG/I	00 (G + + -f1 U	37  PBLKVF BS  99LE1168-1  SOIL  1.0  UG/K  100  95	U U U U U U U U U U U U U U U U U U U		-fl	***************************************			=fl==		
Sample Information Charcoclor-1016_Aroclor-1221_Aroclor-1232_	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-I SOIL 1.0 UG/I  105 100  33 67	V	37 PBLKVF BS 99LE1168-3 SOIL 1.0 UG/8	### ##################################		-fl	***************************************			=fl==		
Aroclor-1260  Sample Inflormation  C L Sample	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-1 SOIL 1.6 UG/I  105 100  33 67 33	00000000000000000000000000000000000000	37 PBLKVF BS 99LE1168-1 SOIL 1.0 UG/K 100 95	U U U U U U U U		-£1	***************************************			=fl==		
Sample Inflormation C Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242	Cust ID:  RFW#: Matrix: D.F.: Units: Tetrachloro-m-xylene Decachlorobiphenyl	37 PBLKVF 99LE1168-I SOIL 1.0 UG/I  105 100  33 67 33 33	00000000000000000000000000000000000000	37  PBLKVF BS  99LE1168-1  SOIL  1.0  UG/R  100  95  33 67 33 33	### DO CG		-fl	***************************************			=fl==		

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

### Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Chemical and Environmental Measurement Information

### Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW#: 9909L129

SDG/SAF#: H0534/B99-078

W.O.#: 10985-001-001-9999-00

Date Received: 09-17-99

### **PCB**

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were extracted on 09-27-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-09-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for extraction and analysis have been met.
- 3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
- 4. The method blank was below the reporting limits for all target compounds.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. The blank spike recovery was within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.
- 8. All initial calibrations associated with this data set were within acceptance criteria.
- 9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 7 pages.

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11-20-90



Chemical and Environmental Measurement Information

### Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW#: 9909L127 6/22/99

SDG/SAF#: H0539/B99-078

W.O.#: 10985-001-001-9999-00

Date Received: 09-17-99

**PCB** 

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were extracted on 09-27-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-08,09-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- The cooler temperature has been recorded on the chain-of-custody. 1.
- 2. All required holding times for extraction and analysis have been met.
- 3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
- 4. The method blank was below the reporting limits for all target compounds.
- 5. All surrogate recoveries were within acceptance criteria.
- 6. The blank spike recovery was within acceptance criteria.
- 7. All matrix spike recoveries were within acceptance criteria.
- 8. All initial calibrations associated with this data set were within acceptance criteria.
- 9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

Michael Taylor

Vice President

Philadelphia Analytical Laboratory

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of \$ pages.

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Appendix 5

**Data Validation Supporting Documentation** 

# PESTICIDE/PCB DATA VALIDATION, CHECKLIST

	Α	В	(0)	D	Ε
PROJECT: 2	00-CW-	- (	DATA PACKAG	E: H053	4
VALIDATOR:	TLL	LAB: P <	cra	DATE: 12	20/25
CASE:	•		SDG: HC	5.34	
		ANALYSES	PERFORMED		
CL53/90	☐ SW-846 8080	☐ SW-846 8081	& 2085	0	0
SAMPLES/MATE	IX Bow	BRO B	owari 5	BOWBRZ	nowary
	BOWBR	5 BOWR	orl Boc	ubri Bo	WBRE
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					Soil
omments:	· <del></del>		• • • • • •		Yes No N/
omments:				(	Yes NO N/
Comments:	TIMES				Yes NO N/
. HOLDING					
Are sample ho		acceptable?			
2. HOLDING TARE sample hold to the comments:  3. INSTRUME 3.1 INSTRUME Are DDT reter	olding times  NT PERFORMANC  ENT PERFORMAN	acceptable?  E AND CALIBRA  CE (METHOD 80	ATIONS 080 AND 8081)		Yes No N

A-5/2 000020

# PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? Yes	No Pi	N/A)
Is the GC/MS tuning/performance check acceptable? Yes	No (	N/A
Comments:		$\stackrel{\smile}{-}$
· · · · · · · · · · · · · · · · · · ·		
<u> </u>		
3.2 CALIBRATIONS (METHOD 8080 AND 8081)		
Are EVAL standard calibration factors and %RSD values acceptable? Yes	No (	N/A
Are quantitation column calibration factor %RSD values acceptable? Yes	No	N/A
Were the analytical sequence requirements met? Yes	No	N/A
Are continuing calibration %D values acceptable? Yes	Ио ₹	N/A
Comments:		<u> </u>
3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)  Was the initial calibration sequence performed? Yes  Was the resolution acceptable in the resolution check mix? . Yes  Is resolution acceptable in the PEM, INDA and INDB? Yes  Are DDT and Endrin breakdowns acceptable? Yes  Are retention times in PEMs acceptable? Yes	No No No	N/A N/A N/A N/A N/A
Are RPD values in the PEMs acceptable? Yes  Are %RSD values acceptable? Yes  Comments:	No (	N/A
<u> </u>		
3.4 CALIBRATION VERIFICATION (3/90 SOW)	, (	
Were the analytical sequence requirements met? Yes	No	N/A
Is resolution acceptable in the PEMs? Yes	No	N/A
Are initial calibrations acceptable?	/	-N/A

A-to

# PESTICIDE/PCB DATA VALIDATION CHECKLIST

Comments:	<del></del>		
Are LCS results acceptable?	. Yes	No	N/A
Were LCS samples analyzed?		No	N/A
Are MS/MSD results acceptable?	<i></i>	No	N/A
Were MS/MSD samples analyzed?		No	N/A
Are surrogate recoveries acceptable?	. (Yes)	No	N/A
S. ACCURACY Were surrogates analyzed?	. નૂકે -	No	N/A
Comments:			$\frac{\cdot}{-}$
Are field/trip blank results acceptable?		No	
Were field/trip blanks analyzed?		(NO)	N/A
Are laboratory blank results acceptable?	> <del>&gt;</del>	No	N/A
<pre>I. BLANKS Vere laboratory blanks analyzed?</pre>	Yes	No	N/A
· · · · · · · · · · · · · · · · · · ·			
Comments:	, 165	ио	M/N
Was Florisil cleanup performed?		No	N/A
s the GPC calibration check acceptable?		No   No	N/A
las GPC cleanup performed?		No	N/A
re the DDT and endrin breakdowns acceptable?		No	N/A
re RPD values in the PEMs acceptable?		No	N/A
PEMs, INDA and INDB mixes?		No	N/A

# PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION	7
Are MS/MSD RPD values acceptable? Ye	s) No N/A
Are laboratory duplicate results acceptable? Ye	s No WA
Are field duplicate RPD values acceptable?	No N/A
Are field split RPD values acceptable? Ye	
Comments:	
	· · · · · · · · · · · · · · · · · · ·
7. SYSTEM PERFORMANCE	
Is chromatographic performance acceptable? Ye	es No/N/A
Are positive results resolved acceptably? Ye Comments:	es No (N/A)
8. COMPOUND IDENTIFICATION AND QUANTITATION  Is compound identification acceptable?	es No (N/A
Is compound quantitation acceptable?	<b>\</b> .
9. REPORTED RESULTS AND QUANTITATION LIMITS	<u> </u>
	es No N/A
	es No N/A
Do results meet the CRQLs?	es No N/A
Comments:	

Date:

21 January 2000

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

200 Area Source Characterization - 200-CW-1 Operable Unit

Subject: Wet Chemistry - Data Package No. H0534-RLN (SDG No. H0534)

### INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
BOWBR0	9/14/99	Soil	С	See note 1
BOWBR1	9/14/99	Soil	С	See note 1
BOWBR2	9/14/99	Soil	С	See note 1
BOWBR4	9/14/99	Soil	С	See note 1
BOWBR5	9/15/99	Soil	С	See note 1
BOWBR6	9/15/99	Soil	С	See note 1
BOWBR7	9/15/99	Soil	С	. See note 1
BOWBR8	9/15/99	Soil	С	See note 1

<sup>1 -</sup> IC Anions - 300.0 chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide -9010B; pH - 9045; sulphide - 9030B; chromium-VI - 7196A; nitrate/nitrite - 353.2.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

### **DATA QUALITY OBJECTIVES**

### Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, fluoride, and sulfate); 14 days for cyanide; 7 days for sulfide; 2 days for IC anion (phosphate, nitrate and nitrite); and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all parameters and samples.

#### Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the CRQL to be acceptable.

All method blank results were acceptable.

#### Accuracy

### Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample value below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

#### Precision

### Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to the lack of a duplicate analysis, all cyanide results in samples BOWBR5, BOWBR6, BOWBR7 and BOWBR8 were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOWBR7) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for nitrate and nitrate/nitrite were outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

### Analytical Detection Levels

Reported analytical detection levels are compared against the CRDL to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above the CRDL: All undetected fluoride, nitrite, nitrate and ammonia results. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific CRDL.

### • Completeness

Data Package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion rate was 100%.

### **MAJOR DEFICIENCIES**

None found.

### MINOR DEFICIENCIES

Due to the lack of a duplicate analysis, all cyanide results in samples BOWBR5, BOWBR6, BOWBR7 and BOWBR8 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following reported detection limits were above the CRDL: All undetected fluoride, nitrite, nitrate and ammonia results. Under the BHI statement of work, no qualification is required.

#### REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The
   associated concentration is an estimate, but the data are usable for
   decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Summary of Data Qualification

### DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cyanide	J	BOWBR5, BOWBR6, BOWBR7, BOWBR8	No duplicate analysis

**Qualified Data Summary and Annotated Laboratory Reports** 

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Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																•	
Case	SDG: F	10534										<b>.</b>					
Sample Number		BOWBRO		BOWBR1		BOWBR2		BOWBR4		BOWBR5		BOWBR6		BOWBR7		BOWBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks										<u> </u>							
Sample Date		9/14/99		9/14/99		9/14/99		9/14/99		9/15/99		9/15/99		9/15/99		9/15/99	$\overline{}$
General Chemistry	CRDL	Result	a	Result	Q	Result	٥	Result	Q	Result	<u>a</u>	Result	0	Result	<u>a</u>	Result	Q
Chloride	2	3.4		6.0	L.	1.5		1.5	_	2.0	L.	3.2	L_	2.7	_	2.2	-
Fluoride	1	2.8	U	2.7	U	2.6	U_	2.6	U	2.5	U	2.6	U	2.6	U_	1.4	U
Nitrite	1	1.4	U	1.3	U	1.3	υ	1.3	U	1.3	U	1.3	υ	1.3	U	1.4	U
Nitrate	0.2	24		4.0		1.3	U	1.3	U	4.7	L	9.9	Ĺ_	5.4	_	8,5	+
Cyanide	_ 1	0.55	5	0,54	U	0.52	U_	0.51	υ	0.51	3	0.53	υJ	0.52	υJ		
Phosphate by IC	6	1.4	5	1.6		1.6	L	1.4		2.8		3.8	<u> </u>	3.2	<u> </u>	1.4	U
Chromium VI	0.7	0.44	5	0.43	U	0.41	U	0.41	U	0.41	Ų	0.42	<u>u</u>	0.42	U	0.44	U
Sulfate by IC	10	198		139		4.4		6.2		29.0	L.	37.5	L_	34.1		40.9	Ш
Nitrate/Nitrite		6,5		1,2	Ĺ	0.91		1.3	L	1.2		2.4	<u> </u>	1,5	$oxed{}$	2.8	Ш
Ammonia	0.5	1,4	IJ	1.3	υJ	1,3	ບນ	1,3	IJ	1.3	U	1.3	Ų	1.3	U.	1.4	U
Ph*		8.2		8.2		8.8		8.9		8.8		8.7	<u> </u>	9.2		8.6	Ш
Sulfide	20	3.8		1.1	U	1.0	u	3.5		1.0	ح	4.0		4.0	<u> </u>	1.1	U
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#### ... INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 WORK ORDER: 10985-001-001-9999-00 RECRA LOT #: 9909L129

					reporting -	DILUTION
Sample	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
******	**************		*****	,,,,,,,,	*******	
-001	BOWBRO	• Solids	90.6	•	0.01	1.0
		Chloride by IC	3.4	MG/K <b>G</b>	1.4	1.0
		Pluoride by IC	2.8 u	· .	2.8	1.0
		Nitrite by IC	1.4 u	MG/KG	1.4	1.0
•		Nitrate by IC	24	MG/KG	. 1.4	1.0
		Cyanide, Total	0.55 u	MG/KG	. 0.55	1.0
	•	Phosphate by IC	1.4 · u	mg/kg	1.4	1.0
		Chromium VI	0.44 u	MG/KG	0.44	1.0
		Sulfate by IC	198	mg/kg	13.0	10.0
		Nitrate Nitrite	6.5	MG/KG	0.22	1.0
	•	Ammonia, as N	1.4 u	MG/KG	1.4	1.0
•		рH	1.2	SOIL PH	0.01	1.0
		Sulfide	3.8	MG/KG	1.1	1.0
-002	BOWBRI	• Solide	92.9	•	0.01	1.0
		Chloride by IC	6.0	mg/kg	1.3	1.0
		Fluoride by IC	2.7 u	MG/KG	2.7	1.0
		Nitrite by IC	1.3 u	MG/KG	1.3	1.0
		Nitrate by IC	4.0	MG/KG	1.3	1.0
•		Cyanide, Total	. 0.54 u	MG/KG	0.54	1.0
		Phosphate by IC	1.6	MG/KG	1.3	1.0
		Chromium VI	0.43 u	MG/KG	0.43	1.0
	•	Sulfate by IC .	139	MG/KG	13.5	10.0
		Nitrate Nitrite	1.2	MG/K <b>G</b>	0.21	1.0
	•	Ammonia, as N	1.3 u	MG/KG	. 1.3	1.0
		pH	8.2	SOIL P	0.01	1.0
		Sulfide	1.1 u	MG/KG	1.1	1.0
-003	BOWBR2	% Solids	97.0	•	0.01	1.0
	4	Chloride by IC	1.5	MG/KG	1.3	1.0
		Fluoride by IC	2.6 u	MG/KG	2.6	1.0
•		Nitrite by IC	1.3 u	MG/KG	1.3	1.0
		Nitrate by :IC	1.3 u	MG/KG	1.3	1.0
		Cyanide, Total	0.52 u	MG/KG	0.52	1.0
	;	Phosphate by IC	1.6	MG/KG	. 1.3	1.0
		Chromium VI	0.41 u	-	0.41	1.0
		Sulfate by IC	4.4.	MG/KG	1.3	1.0
	•	Nitrate Nitrite	0.91	MG/KG	0.21	1.0
•		Ammonia, as N	1.3 u	•	1.3	1.0
		pH.		SOIL P	H 0.01	1.0

1/21/02

#### INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: THU-HANFORD B99-078

WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 99091129

						REPORTING	DILUTION
Sample	SITE ID	ANALYTE	RESULT		UNITS	LINIT	PACTOR
	****************	**************		-		*****	*******
-003	BOWBR2	Sulfide	1.0	u	MG/KG	. 1.0	1.0
-004	BOWBR4	1 Solids	97.9		•	0.01	1.0
		Chloride by IC	1.5		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	. 2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	1.3	u	MG/KG	1.3	1.0
		Cyanide, Total	0.51	u	MG/KG	0.51	1.0
		Phosphate by IC	1.4		MG/KG	1.3	1.0
		Chromium VI	0.41	u	MG/KG	0.41	1.0
		Sulfate by IC	6.2		MG/KG	1.3	1.0
		Nitrate Nitrite	1.3		MG/KG	0.20	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
•		рH	8.9		SOIL PH	0.01	1.0
		Sulfide	3.5		MG/KG	1.0	1.0

W/21/00

#### INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 WORK ORDER: 10985-001-001-9999-00 RECRA LOT #: 9909L127

					REPORTING	DILUTION
Sample	SITE ID	ANALYTE	RESULT	UNITS	LINIT	<b>FACTOR</b>
	************	*************		****	**************	
-001	BOWBRE '	% Solids	90.9	•	0.01	1.0
		Chloride by IC	2.2	MG/KG	1.4	1.0
		Pluoride by IC	1.4 u	MG/KG	1.4	1.0
		Nitrite by IC	1.4 u	MG/KG	1.4	1.0
		Nitrate by IC	8.5	MG/KG	. 1.4	1.0
		Cyanide, Total	0.55 u	нс/кс	0.55	1.0
	•	Phosphate by IC	1.4 u	MG/KG	1.4	1.0
		Chromium VI	0.44 u	MG/KG	0.44	1.0
		Sulfate by IC	40.9	MG/KG	1.4	1.0
•		Nitrate Nitrite	2.8	MG/KG	0.22	1.0
		Ammonia, as N	1.4 u	MG/KG	1.4	1.0
	•	рH	8.6	SOIL PH	0.01	1.0
		Sulfide	1.1 <sub>.</sub> u	NG/KG	1.1	1.0
-002	BOWERS .	♦ Solids	98.1	•	0.01	1.0
		Chloride by IC	2.0	MG/KG	1.3	1.0
•		Fluoride by IC	2.5 u	MG/KG	2.5	1.0
		Nitrite by IC	1.3 u	MG/KG	1.3	1.0
•		Nitrate by IC	4.7	MG/KG	1.3	1.0
•		Cyanide, Total	0.51 u	MG/KG	0.51	1.0
		Phosphate by IC	2.8	MG/KG	1,3	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
		Sulfate by IC	29.0	MG/KG	1.3	1.0
		Nitrate Nitrite	1.2	MG/KG	0.20	1.0
	·	Ammonia, as N	1.3 u	MG/KG	1.3	1.0
	•	PH		SOIL PH	0.01	1.0
•		Sulfide	1.0 u	MG/KG	1.0	1.0
-003	BOWER4	% Solide	94.6	• '	0.01	1.0
		Chloride by IC	3.2	MG/KG	1.3	1.0
		Fluoride by IC	2.6 u	-	2.6	1.0
		Nitrite by IC	1.3 u	,	1.3	1.0
		Nitrate by:IC	<b>9.9</b>	_MG/KG	1.3	1.0
		Cyanide, Total		)MG/KG	0.53	1.0
	· ·	Phosphate by IC	3.8	MG/KG	1.3	1.0
		Chromium VI	0.42 u		0.42	1.0
		Sulfate by IC	37.5	MG/KG	1.3	1.0
		Nitrate Nitrite	2.4	MG/KG	0.21	1.0
•		Ammonia, as M		MG/KG	1.3	1.0
	•	pH	6.7	SOIL M	и 0.01	1.0

1/2/100

### INORGANICS DATA SUMMARY\_REPORT....12/01/99...

CLIENT: TNU-HANFORD B99-078

WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9909L127

					REPORTING	DILUTION
Sample	SITE ID	ANALYTE	RESULT	UNITS	Linit	PACTOR
*******		*****************	******			********
-003	BOWBR .	Sulfide	4.0	HG/KG	1.1	1.0
-004	BOWBR7	* Solids	95.7	•	0.01	1.0
		Chloride by IC	2.7	MG/KG	. 1.3	1.0
		Fluoride by IC	2.6 u	MG/KG	2.6	1.0
		Nitrite by IC	1.3 u	MG/KG	1.3	1.0
		Nitrate by IC	5.4	MG/KG	1.3	1.0
		Cyanida, Total	0.52 V	MG/KG	0.52	1.0
		Phosphate by IC	3.2	MG/KG	1.3	1.0
		Chromium VI	0.42 u	MG/KG	0.42	1.0
		Sulfate by IC	34.1	MG/KG	1.3	1.0
		Nitrate Nitrite	1.5	MG/KG	0.21	1.0
		Ammonia, as N	1.3 u	MG/KG	1.3	1.0
		рн .	9.2	SOIL P	0.01	1.0
		Sulfide	4.0	MG/KG	1.0	1.0

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Laboratory Narrative and Chain-of-Custody Documentation



Chemical and Environmental Measurement Information

### Recra LabNet Philadelphia **Analytical Report**

W.O. #: 10985-001-001-9999-00 Client: TNU-HANFORD B99-078

Date Received: 09-17-99 RFW#: 9909L127 and 9909L129

SDG#: H0534 SAF#: B99-078

### INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 8 soil samples.

- 2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.
- 3. Sample holding times as required by the method and/or contract were met with the exception of Sulfide samples and matrix quality control analyses for Total Cyanide sample B0WBR0.
- The cooler temperatures were recorded on the chain-of-custodies. 4.
- The method blanks were within method criteria. 5.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recoveries were within the 75-125% control limits; matrix spike recovery for Nitrate Nitrite was based on the replicate analysis result. The matrix spike duplicates were within the 20% RPD control limit.
- 8. The replicate analyses were within the 20% RPD control limit.
- 9. Results for solid samples are reported on a dry weight basis.

J. Michael Taylor

Vice President

njp\i09-127,129

Philadelphia Analytical Laboratory

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report a integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 30 pages.

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integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of

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**Data Validation Supporting Documentation** 

### WHC-SD-EN-SPP-002, Rev. 2

# GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

LEVEL:	A	В	(C)	D	E				
PROJECT: 200-CW-/ DATA PACKAGE: H0534									
VALIDATOR:	TL(	LAB: Rea	Rt	DATE: 12/2	0/55				
CASE:		,	SDG: Ho	534					
		ANALYSES	PERFORMED						
Anions/IC	□тос	🗅 тох	☐ TPH-418.1	Oil and Gresse	Alkelinity				
DCAmmonia .	□ BOD/COD	□ Chloride	☐ Chromium-VI	SQH	MO NO.				
☐ Sulfate	□ TDS	□ TKN	Phosphate	& Sulphile	Beyande				
ACEUT	0	0	0		0				
SAMPLES/MATE	RIX BOWR	RO BO	JUBRI	BowB	29				
	RY BO								
	Bow BR								
			101.4	· · · · · · · · · · · · · · · · · · ·					
					Sail				
Is technical Is a case nam	verification	nt?	n present? .						
Is technical Is a case nan Comments:	verification rrative preser	documentation	n present? .	· .					
Is technical Is a case nan Comments:  2. HOLDING	verification rrative preser	documentation	n present? .		Yes No N/A				
Is technical Is a case nan Comments:  2. HOLDING Are sample he	verification rrative preser	documentationnt?	n present?						
Is technical Is a case nan Comments:  2. HOLDING Are sample he	verification rrative preser TIMES olding times	documentationnt?	n present?		Yes No N/A				
Is technical Is a case nan Comments:  2. HOLDING Are sample he	verification rrative preser TIMES olding times	documentationnt?	n present?		Yes No N/A				
Is technical Is a case nan Comments:  2. HOLDING Are sample he	verification rrative preser TIMES olding times	documentationnt?	n present?		Yes No N/A				

-K-23

# WHC-SD-EN-SPP-002, Rev. 2

# GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION
Was initial calibration performed for all applicable analyses? Yes No ('N/A)
Are initial calibration results acceptable? Yes No N/A
Was a calibration check performed for all applicable analyses? Yes No N/A
Are calibration check results acceptable? Yes No $N/A$
Comments:
4. BLANKS
Were laboratory blanks analyzed?
Are laboratory blank results acceptable?
Were field/trip blanks analyzed? Yes No N/A
Are field/trip blank results acceptable? Yes No N/A
Comments:
5. ACCURACY
Were spike samples analyzed at the required frequency?
Are spike recoveries acceptable? Yes No N/A
Were LCS analyses performed at the required frequency? Yes No NA
Are LCS recoveries acceptable? Yes No (N/A)
Comments: No exercise Motors 5,4,7,8 ~ Jat not required
-No amoun Mr 0,1,2,4 - July (ran (cs))
6. PRECISION
Were laboratory duplicate samples analyzed
at the required frequency?
Are field split RPD values acceptable? Yes No N/A

### WHC-SD-EN-SPP-002, Rev. 2

### GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: No day for ot Jall
BR4/BR71 No against dup 5,4,78-+
1 Nitrate out 1003/NOS
7. ANALYTE QUANTITATION
Was analyte quantitation performed properly? Yes No N/A
Comments:
8. REPORTED RESULTS AND DETECTION LIMITS
Are results reported for all requested analyses? (Yes) No N/A
Are results supported in the raw data? Yes No NA
Are results calculated properly? Yes No N/A
Do results meet the CRDLs? Yes No N/A
Comments: ammina - all over
cyamole - all one
netrite - all over
nitrare all undat
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#### INORGANICS DUPLICATE SPIKE REPORT 12/01/99

CLIENT: THU-HANFORD B99-078

RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

			SPIKE#:	spike#:	2
sampl <b>s</b>	SITE ID	ANALYTE	*RECOV	ARECOV	ADIFF
******	*************	*********		*****	
-001	BOWBR8	Chloride by IC	97.1	97.3	0.25
		Fluoride by IC	109.4	109.5	0.11
		Nitrite by IC	103.4	105.2	1.8
		Nitrate by IC	104.3	103.9	0.37
		Phosphate by IC	105.6	105.9	0.25
		Sulfate by IC	100.6	100.5	0.11
-004	BOWBR7	Sulfide	99.0	97.0	2.0
		Nitrate Nitrite	98.6	111.1	11.9
BLANK10	99LN3D47-MB1	Nitrate Nitrite	101.0	102.6	1.6
BLANK10	99LAM038-MB1	Ammonia, as N	97.2	102.0	4.8
BI.ANK10	997.STNB49-MR1	Sulfida	94.0	95.0	1.1

#### -INORGANICS-PRECISION-REPORT -- 12/01/99

CLIENT: TNU-HANFORD B99-078

RECRA LOT #: 9909L127

WORK ORDER: 10965-001-001-9999-00

			INITIAL		•	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD	factor (rep)
*******		****************				********
-001REP	BOWBRS	Chloride by IC	2.2	2.2	1.0	1.0
		Fluoride by IC	1.4 u	1.4 u	NC	1.0
	•	Nitrite by IC	1.4 u	1.4 u	NC	1.0
		Nitrate by IC	1.5	8.5	0.46	1.0
		Phosphate by IC	1.4 u	1.4 u	NC	1.0
		Sulfate by IC	40.9	41.3	0.80	1.0
		Ammonia, as N	1,4 u	1.3 u	ИÇ	1.0
-004RBP	BOWBR7	* Solide	95.7	96.8	1.2	1.0
		Chromium VI	0.428	0.424	NC	1.0
		Nitrate Nitrite	1.5	1.6	7.4	1.0
		pH ·	9.2	9.2	0.0	1.0
		Sulfide	4.0	1.0 u	NC	1.0
RI.ANRED	99LTC281-MB1	Sulfate by TC	1 2 11	24.0	NC	1.0

Date:

21 January 2000

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

200 Area Source Characterization - 200-CW-1 Operable Unit Subject: Inorganics - Data Package No. H0534-RLN (SDG No. H0534)

#### INTRODUCTION

This memo presents the results of data validation on Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analys <b>is</b>
BOWBRO	9/14/99	Soil	.c	See note 1
BOWBR1	9/14/99	Soil	С	See note 1
BOWBR2	9/14/99	Soil	С	See note 1
BOWBR4	9/14/99	Soil	c ·	See note 1
BOWBR5	9/15/99	Soil	· c	See note 1
BOWBR6	9/15/99	Soil	С	See note 1
BOWBR7	9/15/99	Soil	С	See note 1
BOWBR8	9/15/99	Soil	С	See note 1

<sup>1-</sup> ICP metals by 6010B; mercury by 7471A.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

#### **DATA QUALITY OBJECTIVES**

#### Holding Times

Analytical holding times for mercury and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within six (6) months for ICP metals and 28 days for mercury.

All holding times were acceptable.

#### Blanks

### **Preparation Blanks**

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

#### Accuracy

#### Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 25% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to matrix spike recoveries of 48% and 50%, all antimony results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

#### Precision

### **Laboratory Duplicate Samples**

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ".

All laboratory duplicate results were acceptable.

#### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOWBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for chromium was outside QC limits (49%). Under the BHI statement of work, no qualification is required. All field duplicate results were acceptable.

#### Analytical Detection Levels

Reported analytical detection levels are compared against the to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific CRDL.

#### Completeness

Data package No. H0534 was submitted for validation and verified for completeness. The completion percentage was 100%.

#### MAJOR DEFICIENCIES

None found.

### **MINOR DEFICIENCIES**

Due to matrix spike recoveries of 48% and 50%, all antimony results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### **REFERENCES**

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

# **DATA QUALIFICATION SUMMARY**

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery
		•	

Qualified Data Summary and Annotated Laboratory Reports

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<del>3</del> 0			]													
			]													
SDG: HO	534															
	BOWBRO		BOWBR1		BOWBR2		BOWBR4		BOWBR5		BOWBR6		BOWBR7		BOWBR8	
	B8758		B8758		B8758		B8758		B8758		88758		B8758		B8758	
							I						Duplicate			
	09/14/99		09/14/99		09/14/99	•	09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
CRDL					Result	Q			Result	Q	Result	a	Result	Q		Q_
2			0.1	U	0.10	U	0.09	U	0.10	U	0.10	Ü	0.1	U	0,1	U
1	5.2	l	4.6		2.0		2.0		1.8		2.5		2.2		2.8	
1	58.6	<u> </u>	79,9	L	58.7		60.5		60.7		91.5		64.9		100	
0.2	0.13		0.21		0.14		0.11		0.12		0.23		0.17		0.29	
0.04	1,7		0.36		0.09		0.09		0.24		0.28		0.29	Г	0.34	
1	8.7		6.2		4.2		10.4		4.9	I	4.3		6.7		5.1	
2	11.3		14.0		12.6		11.6		12.1		15.6		14.3		16.6	Γ
0.05	0.42		0.18		0.01	U	0,01	U	0.01	U	0.02	U	0.02	U	0.02	U
4	7.0		6.9		4.7		7.7		5.3		6.3	$\Gamma$	6.9		7.3	
20	43.4		20,8		3.1		2.8		3.7		3.1	Ī	4.0		3,1	
	0.23	3	0.25	IJ	0.25	บบ	0.23	UJ	0.25	W			0.24	S	0.24	UJ
20	0.34	ح	0.37	حا	0.37	U	0.34	Ü_	0.38	U	0.37	Ų.	0.36	υ	0.35	U
	0.49	ح	0.52	U	0.53	5	0.49	U	0.54	U	0.53	U	0.52	Ü	0.51	U
3	66.3		53.7		40.5								61.5		91.4	_
2	48.2		44.8		33.9		4 37.6		37.2		48.8		44.1		50.2	
										Щ						
	CRDL 2 1 1 0.2 0.04 1 2 0.05 4 20	SDG: H0534   B0WBR0   B8758   O9/14/99   CRDL   Result   2 0.29   1 58.6   0.2 0.13   0.04 1.7   1 8.7   2 11.3   0.05 0.42   4 7.0   20 43.4   0.23   20 0.34   0.49   3 66.3	SDG: H0534   B0WBR0   B8758	SDG: H0534   B0WBR0   B0WBR1   B8758   B8758	SDG: H0534   BOWBR0   BOWBR1   B8758   B8758	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   B8758   B875	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   B8758   B875	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   B8758   B87	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   B8758   B87	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   BOWBR5   B8758   B8	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   BOWBR5   B8758   B758   B758	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   B8758   B	SDG: H0534   BOWBRO   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   B8758   B9758   B	SDG: H0534   BOWBRO   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   BOWBR7   B8758   B9758   B9758	SDG: H0534   BOWBR0   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   BOWBR7	SDG: H0534   BOWBRO   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   BOWBR7   BOWBR8   B8758   B8758

#### Hecra LabMet - Licoville

#### INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: THU-HAMFORD B99-078 WORK ORDER: 10985-001-001-9959-00 RECRA LOT #: 9909L129

					REPORTING	DILUTION
SAMPLE	SITE ID	ARALYTE	RESULT	UNITS	LIMIT	PACTOR
	**************	******************	******			
-001	BOWERO	Silver, Total	0.29	MG/KG	0.09	1.0
	•	Arsenic, Total	5.2	No/Ko	0.31	1.0
		Barium, Total	50.6	Ma/Ka	0.03	1.0
		Beryllium, Total	0.13	MG/KG	. 0.009	1.0
		Cadmium, Total	1.7	MG/KG	0.03	1.0
		Chromium, Total	8.7	MG/KG	0.87	1.0
		Copper, Total	11.3	Mg/KG	0.11	1.0
		Mercury, Total	0.42	mg/kg	0.02	1.0
		Nickel, Total	7.0	MG/KG	0.11	1.0
		Lead, Total	43.4	Ma/Ka	0.19	1.0
		Antimony, Total	0.23 🍕	Ma/Ka	0.23	1.0
		Selenium, Total	0.34 u	mg/Rg	0.34	1.0
		Thallium, Total	0.49 u	Mg/Kg	0.49	1.0
		Vanadium, Total,	66.3	MG/KG	0.06	1.0
•		Zine, Total	48.2	MG/RG	0.07	1.0
-002	BOMBET	Silver, Total	0.1 u	Mg/Kg	0.1	1.0
		Arsenic, Total	4.6	MG/KG	0.33	1.0
		Barium, Total	79.9	MG/KG	0.03	1.0
	• *	Beryllium, Total	0.21	MG/RG	0.01	1.0
•		Cadmium, Total	0.36	MG/KG	0.03	1.0
	• •	Chromium, Total	6.2	Mg/Kg	0.00	1.0
		Copper, Total	14.0	Mg/Kg	0.12	1.0
		Mercury, Total	0.18	Ma/KG	0.02	1.0
		Mickel, Total	6.5	Mg/KQ	0.12	1.0
• '		Lead, Total	20.8	MG/KO	0.21	1.0
		Antimony, Total	0.25 u	Jwo/xo	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Thallium, Total	0.52 u	Mg/Kg	0.52	1.0
		Vanadium, Total	53.7	mg/kg	0.06	1.0
		Ling, Total	44.8	MG/KG	0.08	1.0

pr/1/1/0/00

#### INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: THU-HAMPORD B99-078

RECRA LOT #: 99091129

WORK ORDER: 10985-001-001-9999-00

	EK: 10382-001-001-3333-			-	REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	YACTOR
******	*************	200000000000000000000000000000000000000				*******
-003	BOWBR2	Silver, Total	0.10 u	MO/KO	0.10	1.0
		Arsenic, Total	2.0	MG/KG	0.33	1.0
	•	Barium, Total	50.7	MG/KG	0.03	1.0
		Beryllium, Total	0.16	MG/KG	20.0	1.0
		Cadmium, Total	0.09	mg/Rg	0.03	1.0
		Chromium, Total	4.2	Mg/Kg	0.00	1.0
		Copper. Total	12.6	MG/KG	0.12	1.0
		Mercury, Total	0.01 u	MG/KØ	0.01	1.0
		Mickel, Total	4.7	, MG/KG	0.12	1.0
		Lead, Total	3.1	MQ/KQ	0.21	1.0
		Antimony, Total	0.25 u	Jug/Ka	0.25	1.0
		selenium, Total	0.37 u	Mg/Kg	0.37	1.0
		Thallium, Total	0.53 u	MG/KG	0.53	1.0
		Vanadium, Total.	40.5	MG/KG	0.06	1.0
•		Zine, Total	33.9	MG/KG	0.08	1.0
-004	BOWBR4	silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.0	149/X6	0.30	1.0
		Barium, Total	60.5	Mg/Rg	0.03	1.0
	• •	Beryllium, Total	0.11	mg/ka	0.009	1.0
		Cadmium, Total	0.03	MG/KG	0.03	1.0
	• •	Chromium, Total	10.4	mg/kg	0.07	1.0
		Copper, Total	11.6	Mg/Kg	0.11	1.0
		Mercury, Total	0.01 u	MG/KA	0.01	1.0
		Nickel, Total	7.7	MG/KQ	0.11	1.0
		Lead, Total	2.8	Ma/Ka	0.19	1.0
		Antimony, Total	0.23 u	Û MG/KØ	0.23	1.0
		Selenium, Total	0.34 u	NG/KG	0.34	1.0
		Thellium, Total	0.49	ng/Rg	0.49	1.0
		Vanadium, Total	50.4	mg/kg	0.06	1.0
		Zino, Total	37.6	MG/KG	0.07	1.0

1/1400

### INORGANICS DATA SURGARY REPORT 11/09/99

CLIENT: THT-HANFORD B99-078

RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIKIT	··· PACTOR
******	************		*******	•••••		*******
-003	BOWERS	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	2.5	MG/KG	0.33	1.0
		Barium, Total	91.5	MG/KG	0.03	1.0
		Beryllium, Total	0.23	MG/KG	0.01	1.0
		Cadmium, Total	0.28	MG/KG	0.03	1.0
		Chromium, Total	4.3	MG/KG	0.00	1.0
		Copper, Total	15.6	MG/KG	0.12	1.0
		Mercury, Total	0.02 u	Mg/Kg	0.02	1.0
		Wickel, Total	6.3	· MG/KG	0.12	1.0
		Lead, Total	3.1	MG/KG	0.21	1.0
		Antimony, Total	0.25 u	MG/KG	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
•		Thallium, Total	0.53 u	MG/KQ	0.53	1.0
		Vanadium, Total	89.7	MG/KG	0.06	1.0
		Zinc, Total	48.8	MG/KG	0.00	1.0
-004	BOWERT	Silver, Total	. 0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.2	MG/KG	0.32	1.0
	٠.	Barium, Total	64.9	MG/KG	0.03	1.0
		Beryllium, Total	0.17	MG/KG	0.01	1.0
		Cadmium, Total	0.29	MG/KG	0.03	1.0
		Chromium, Total	6.7	MG/KG	0.08	1.0
		Copper, Total	14.3	Mg/Kg	0.12	1.0
		Mercury, Total	0.02 u	MQ/KG	0.02	1.0
٠.		Mickel, Total	6.9	MG/KG	0.12	1.0
		Lead, Total	4.0	MG/KG	0.21	1.0
		Antimony, Total	0.24 u	Jmg/kg	0.24	1.0
		Selenium, Total	0.36 u	Mg/Kg	0.36	1.0
		Thallium, Total	. 0.52 u	MG/KG	0.52	1.0
		Vanadium, Total	61.5	Mg/Kg	0.06	1.0
		Zinc, Total	44.1	MG/KG	0.08	1.0

1/10/00

#### INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: THU-HANFORD B99-078

RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTS	RESULT	UNITS	LIMIT	· · · PACTOR
*****	*********	**********	*******	*****		******
-001	BOWERS	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.8	MG/KG	0.32	1.0
	•	Barium, Total	100	MG/KG	0.03	1.0
		Beryllium, Total	0.29	MG/KG	0.01	1.0
		Cadmium, Total	0.34	MG/KG	0.03	1.0
		Chromium, Total	5.1	MG/KG	0.0\$	1.0
		Copper, Total	15.6	MG/KG	0.11	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Wickel, Total	7.3	MG/KG	0.13	1.0
		Lead, Total	3.1	MG/KG	0.20	1.0
		Antimony, Total	0.24 u <u></u>	Гио/ко	0.24	1.0
		Selenium, Total	0.35 u	MQ/KQ	0.35	1.0
		Thallium, Total	0.51 u	Ma\ka	9.51	1.0
		Vanadium, Total	91.4	MG/KG	0.06	1.0
		Zing, Total	50.2	MG/KG	0.00	1.0
-002	BOWER5	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	1.0	MG/KG	0.34	1.0
		Barium, Total	60.7	MG/KG	0.03	1.0
	•	Beryllium, Total	0.12	Mg/Kg	0.01	1.0
	• .	Cadmium, Total	0.24	MG/KG	0.03	1.0
		Chromium, Total	4.9	MG/KG	0.0	1.0
		Copper, Total	12.1	MG/KG	0.12	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
٠.		Mickel, Total	5.3	MG/KG	0.12	1.0
		Lead, Total	3.7	MG/KG	0.21	1.0
		Antimony, Total	0.25 u	<b>Јио/к</b> о	0.25	1.0
		Selenium, Total	0.38 u	MG/KG	0.36	1.0
		Thallium, Total	, 0.54 u	MG/KG	0.54	1.0
	•	Vanadium, Total	52.9	MG/KG	0.06	1.0
	• ,	Zine, Total	37.2	MO/KG	0.08	1.0

1/10/00

Laboratory Narrative and Chain-of-Custody Documentation

Chemical and Environmental Measurement Information

## Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

**RFW#:** 9909L127

SDG/SAF#: H0534/B99-078

W.O.#: 10985-001-001-9999-00

Date Received: 09-17-99

### \*REVISION\*

### METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

- 1. This narrative covers the analyses of 4 soil samples.
- The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
- 3. All analyses were performed within the required holding times.
- 4. The cooler temperature has been recorded on the Chain of Custody.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at the following concentration:

		PDS	PDS
Sample ID	Element	Concentration (ppb)	% Recovery
B0WBR8	Antimony	200	94.8

- 12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

mid/m09-127r

11-11-99

Date



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Chemical and Environmental Measurement Information

## Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW#: 9909L129

SDG/SAF#: H0534/B99-078

W.O.#: 10985-001-001-9999-00

Date Received: 09-17-99

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### METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

- 1. This narrative covers the analyses of 4 soil samples.
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- 4. The cooler temperature has been recorded on the Chain of Custody.
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- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recoveries for 2 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 0/0 pages.

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		PDS	PDS .
Sample ID	<b>Element</b>	Concentration (ppb)	% Recovery
B0WBR0	Lead	200	96.8
	Antimony	200	96.8

- 12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

mld/m10-129r

11-11-99



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	Bechtel Hanford	d Inc.		CH	IAIN OF CUS	TODY/S	SAMPL	E ANAI	Lysis	REQ	UEST	B	99-078-11	9 Page 1	of T
	Collector Bowers/Trice		C		ny Contact Cearlock	Telepho 372-	one No. 9574			Project TRENT	Coordinator , SJ	Price Code	8N	Deta Te	rnaround
	Project Designation 200 Area Source characteriz	zation - 200-CW-1 OU	Si	mplis 200 B	ng Location Spond (B8758) <15'		· · · · ·			SAF No B99-071				45	Days
	Ice Chest No.  ERL 96	6 065	FI	eld Lo	ogbook No. Stil	•		· <u>-</u>		Method Fed E	of Shipment				. <del></del> .
	Shipped To TMA/RECRA 5 34 9-14-99		0		Property No. 99 <i>025</i> 7	·		•			Lading/Air Bill 8 -35 79		550	<b>)</b>	
						•	<u></u>			COA	3579 D20cu	1 67	1		
	POSSIBLE SAMPLE HAZ	ARDS/REMARKS	- <del></del>		Preservation	Cool 4C	Cool 4C	None	Cool 4						
					Type of Container	•G	»G	∎G	aG.						
				Γ	No. of Container(s)	l 60mL	250mL	250mL	500m1						
	Special Handling and/or Sto	erage			Volume										
		sample and	ALYSIS			VOA - \$260A (TCL); VOA - \$260A (Add- On) {1- Propanol, 2thenol}	Sani-VOA - 4270A (TCL); TPH-Diesel Range - WTPS-D; PCBs - 8082	See item (1) in Special Bustructions.	See item (7 Special Instruction						
	Sample No.	Matrix *	Sample Da	ite	Sample Time	P. 7. 12 1							7[		
;	BOWBRO	Soil	9.14.9	9	1216	Х	<u> </u>		X		Bource	to	<u>                                     </u>		
	BOWBRO BOWBR1 BOWBR2 BOWBRS	Soil	4.14.	_	1300	<u> Y</u> .	X		X		Bowc	KO	ļ		
)	BOWBR2	Soil	9-14-9	9_	1340	<u> </u>	<u>X</u>			<u> </u>	Bowc	Ro	<u> </u>	<b></b>	<b></b>
9	BOWERS PIPE	Soil	72 111 7	17L.	103					<del>- </del>		<del>-  </del>	<del> </del>	<u> </u>	<u> </u>
	BOWBRY	2-1	9.143	<u> </u>	15 10	<u> X</u> ,	SPEC	IAL INSTR	LICTION		Bowce		<del>.l</del>	Matrix	•
	CHAIN OF POSSESSION		Sign/I	'rint f			See c	hain of custody ze for Np-237,	comments isotopic U,	on SAF I	B99-078. Out of G ICP bottle also and le, and pH.	sums Spec, bott lyze for NO2/N	de also D3, IC	Soil Weer	
ļ	Relinquished By Doug Bow &	7 . 7 - 9 9 / / 70 Date/Tible	Received By	11	3 9-14.98	o/Time	(I) G	lamma Spectro na Spec - Add-	scopy (Ces on (Americ	um-137, ium-241)	Cobelt-60, Europiu ; Strontium-89,90	Total Sr, Total	Urasium	Vapor Other Solid Other Liquid	
	Refer 1B 91 Relinguished By	11.99 11:30	Bu	<u>*</u>	_ Det	1:30 p/Time //:3	(2) K	CP Metals - 601 ium, Silver); K	IOA (Superi CP Metals -	race) (Ar 6010A (S	Thorium (Thorium senic, Barium, Cod Supertrace Add-On)	baium, Chromiu ) (Beryllium, Co	m, Lead,		٠.
ł	Brew Kolt	9/16/99 4:3 Dale/Time	Received By	Ex/	Day	e/Time	$\dashv$	Sinn, Zinc); M l(ec(s/ (s)	lercury - 74	71 -(CV)	; Chromium Hex -	7196			
	tev El	7-17-94:021	15 Victo	He.	9-17-	77 06 <sup>24</sup>	15					·		Date/Time	····
	LABORATORY Received By SECTION					100							·	Due Time	
ı ;	FINAL SAMPLE Disposal M	ichod			- · ·			Dispos	ed Dy						

DISPOSITION

	Bechtel Hanford	Inc.	C	HAIN OF CUS	TODY/S	AMPL	E ANAL	YSIS R	EQUES	ξ ]	B99	9-078-120	Page 1	4 X 2
	Collector Bowers/Trice			pany Contact ris Cearlock	Telepho 372-9				roject Coordi RENT, SJ	nator	Price Code	8N		rnaround
	Project Designation 200 Area Source characteriz	ration - 200-CW-1 OU		ling Location D Boond (B8758) <15'		•			AF No. 99-078			•	45	Days
	Ice Chest No. ERC 96 C	024:		Logbook No.			·	Ň	lethod of Skip Fed Ex	oment	<del></del> -			
	Shipped To Tha/RECRA D 28 9-15-99		Offsit	le Property No. A99025	59				ill of Lading/ 423	579	5295	6/		
					•				COA B 2	ocu	167	jċ		
	POSSIBLE SAMPLE HAZA	ARDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool 4C	None					
			•	Type of Container	»G	øG	aG	#G	p					1
	Special Handling and/or Sto	rage	r	No. of Container(s)  Volume	1 60mL	250mL	250mL	500mL	1145 1:4					
		SAMPLE ANA	LYSIS		VOA - \$266A (TCL); VOA -/ \$260A (Add- On) [1- Fropmal, Ethenol)	Semi-VOA - 8270A (TCL); TPH-Dissel Ranga - WTPH-D; PCBs - 3082	Instructions.	See item (2) i Special Improcisions	" postisto					
	Sample No.	Matrix *	Sample Date	Sample Time			<b>TEAN</b>					1.43		
Ą	BOWER+ 526 9-17-91	Soil	ļ. q		<del> </del>	 	<u> </u>	<u> </u>	<b> </b>			· 		<b> </b> -
Ğ	B0WBR5	Soil 9.15	, <u>, , , , , , , , , , , , , , , , , , </u>		<u> </u>	<u> </u>	<b>}</b>	<u> </u>	1 11		<del></del> -	Rowc		
S	B0WBR6	Soil	9-159		<b>_</b> _X	<b>X</b>	ļ		X 4916	7		Bonc		<del> </del> -
บบบชีวว	BOWBR7	Soil	9.15.9	7 0834	X	X	<del> </del>	X	<del> </del>			Rows	×4	
	CHAIN OF POSSESSION		Sign/Pris		ite/Time	See c	TAL INSTR chain of custody ze for Np-237, is, Sulfides, Am	comments o isotopic U, .	Out of ICP bots	le also anal	amma Spec, bottl lyze for NO2/NO	e also 3, IC	Matrix Soil Water	<b>-</b>
İ	Relimpiished By  Color Olisi Relinquished By  REF 1B 9169	Date/Time	Received By  Received By  Received By	4/15/99 15	30 Ne/Time 19/130 Ne/Time	(1) ( Gen. (2) 1	Gamma Spectro ma Spec - Add- nium); Isotopic CP Metals - 60	scopy (Cesia on (Americia : Plutonium; 1 10A (Supertra	m-137, Cobalt-1 un-241); Stront sotopic Thoriun ice) (Arsenic, B	0, Europie ium-89,90 i (Thorium arium, Cad	an-152, Europius Total Sr; Total 1-232); Americius dinium, Chromius	Uranium m-241 n, Lead,	Vapor Other Solid Other Liquid	• •.
•	Relinquished By SJONG SSEL Relinquished By Tecl E4 9-17-6	7/6 99 130 Date/Time	Received By	GX D	te/Time	COL	nium, Silver); N dium, Zinc); M LOCPUC U	lercury - 747	l - (CV); Chrom	ium Hex -				·
Wird.	LABORATORY Received By SECTION				Tie				_		· ·	t	ale Time	
M	FINAL SAMPLE Disposal M DISPOSITION	iethod					Dispo	sed By				(1	ate Lime	

# Appendix 5

**Data Validation Supporting Documentation** 

# WHC-SD-EN-SPP-002, Rev. 2

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	(c)	D	E
PROJECT: 2	00-cw-1		DATA PACKAGE	: H053'	£
VALIDATOR:	TLI	LAB: Rec	rx	DATE: 17	20/49
CASE:			SDG: 140	<u>534</u>	
		ANALYSES	PERFORMED	·	
□ CLP/ICP	□ CLP/GFAA		☐ CLP/Cyenide	0	O
S SW-846/ICP	□ SW-846/GFAA	X5W-846/Hg	□ SW-846 Cyenide	`	0
			KRI Bows	_	
					soil
1. DATA PACK Is technical Is a case nar Comments:	verification				Yes No N/A Yes No N/A
2. HOLDING 1 Are sample ho	olding times a	-		7	Yes No N/A

\_A-13-2

# WHC-SD-EN-SPP-002, Rev. 2

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS	
Were initial calibrations performed on all instruments? Yes	No (N/A)
Are initial calibrations acceptable? Yes	No N/A
Are ICP interference checks acceptable? Yes	No N/A
Were ICV and CCV checks performed on all instruments? Yes	No N/A
Are ICV and CCV checks acceptable? Yes	No N/A
Comments:	
4. BLANKS	
Were ICB and CCB checks performed for all applicable analyses? Yes	No N/A
Are ICB and CCB results acceptable? Yes	No (V/A)
Were preparation blanks analyzed? Yes	No N/A
Are preparation blank results acceptable?	No N/A
Were field/trip blanks analyzed?	NO N/A
Are field/trip blank results acceptable? Yes	AHO? (NIA)
Comments: PRU/ART CR - 49502	
5. ACCURACY	
Were spike samples analyzed? Yes	No N/A
Are spike sample recoveries acceptable? Yes	No N/A
Were laboratory control samples (LCS) analyzed? Yes	No N/A
Are LCS recoveries acceptable? Yes	No WA
Comments: Antina - J 5,6,7,8 4870 & rec	•
4 0,1,2,4 509, CH	
1 - C11,2 4 7470 (CE	-pe
7778	

# WHC-SD-EN-SPP-002, Rev. 2

## INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION		
Were laboratory duplicates analyzed? Yes	No	n/a
Are laboratory duplicate samples RPD values acceptable? (e)	No	N/A
Were ICP serial dilution samples analyzed? Yes	No (	N/A )
Are ICP serial dilution *D values acceptable? Yes	My 7	N/A)
Are field duplicate RPD values acceptable? Yes	(No)	N/A
Are field split RPD values acceptable? Yes	No	
Comments: CR - 4990		
		<u> </u>
7. FURNACE AA QUALITY CONTROL		$\wedge$
Were duplicate injections performed as required? Yes	No	p//A\
Are duplicate injection %RSD values acceptable? Yes	No	N/A \
Were analytical spikes performed as required? Yes	No /	A/A
Are analytical spike recoveries acceptable? Yes	No	N/A
Was MSA performed as required? Yes	No \	N/A /
Are MSA results acceptable? Yes	No \	N/A/
Comments:		<u></u>
8. REPORTED RESULTS AND DETECTION LIMITS		 
Are results reported for all requested analyses?	No	N/A
Are all results supported in the raw data? Yes	No	
Are results calculated properly? Yes	No	W/A
Do results meet the CRDLs? Yes	) No	N/A
Comments:		

000026

#### Recra LabNet - Lionville

### INORGANICS ACCURACY REPORT 11/09/99

CLIENT: THU-MANFORD B99-078

PROTE TAT #1 99091.129

WORK ORDER: 10985-001-001-9999-00

MORE OFF	PW: 70300-445-444-111.	••					
			SPIRED	DITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	analyte	SAMPLE	RESULT	AMOUNT \$	RECOV	" PACTOR (SPR)
******	*************	*************		******			**********
-001 BOWERO		Silver, Total	5.3	0.29	5.4	92.8	1.0
		Arsenic, Total	204	5.2	214	92.7	1.0
		Barium, Total	260	58.6	214	94.0	1.0
•		Beryllium, Total	5.1	0.13	5.4	92.0	1.0
		Cadmium, Total	6.3	1.7	5.4	#5.2	1.0
		Chromium, Total	29.9	●.7	21.4	99.1	1.0
		Copper, Total	36.1	11.3	26.8	92.5	1.0
		Mercury, Total	0.62	0.42	0.17	119.1	1.0
		Mickel, Total	56.2	7.0	53.6	91.8	1.0
		Lead, Total	<b>63.3</b>	43.4	53.6	74.4	1.0
		Antimony, Total	26.6	0.23u	53.6	49.6	1.0
		Selenium, Total	195	0.34u	214	91.0	1.0
		Thallium, Total	202	0.494	214	94.0	1.0
		Vanadium, Total	111	66.3	53.6	#3.5	1.0
		Pine Babal		40.0		44.2	1.6

#### Recra LabMet - Licoville

### INORGANICS ACCURACY REPORT 11/09/99

CLIENT: THU-HANFORD B99-078

RECRA LOT #: 99091127

MORK ORDER: 10985-001-001-9999-00

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	- Pactor (SPK)
	270322245322276326A		******		******	******	
-001	BOWBES	Silver, Total	4.7	0.1 u	5.1	92.2	1.0
		Areenio, Total	190	2.8	204	91.7	1.0
		Barium, Total	313	100	204	104.3	1.0
		Beryllium, Total	5.a .	0.29	\$.1	32.3	1.0
		Cadmium, Total	5.0	0.34	5.1	91.3	1.0
•		Chronium, Total	25.1	5.1.	20.4	98.0	1.0
		Copper, Total	40.8	16.6	25.5	95.2	1.0
		Mercury, Total	0.19	0.024	0.18	105.6	1.0
		Mickel, Total	53.3	7.3	50.9	90.4	1.0
		Lead, Total	49.7	3,1	51.0	91.4	1.0
		Antimony, Total	24.3	0.24u	50.9	47.7	1.0
		Selenium, Total	1\$2	0.354	204	69.2	1.0
		Thallium, Total	188	0.51u	204	92.3	1.0
		Vanadium, Total	149	91.4	, 50.9	112.6	1.0
* *		Zinc, Total	>>.6	30.2	31.0	96.9	1.0

Date:

21 January 2000

To:

Bechtel Hanford, Inc. (technical representative)

From:

TechLaw, Inc.

Project:

200 Area Source Characterization - 200-CW-1 Operable Unit

Subject: Radiochemistry - Data Package No. H0534-TNU (SDG No. H0534)

### INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
BOWBRO	9/14/99	Soil	С	See note 1
BOWBR1	9/14/99	Soil	С	See note 1
BOWBR2	9/14/99	Soil	С	See note 1
BOWBR4	9/14/99	Soil	С	See note 1
BOWBR5	9/15/99	Soil	С	See note 1 & 2
BOWBR6	9/15/99	Soil	С	See note 1 & 2
BOWBR7	9/15/99	Soil	С	See note 1 & 2
BOWBR8	9/15/99	Soil	С	See note 1 & 2

<sup>1 -</sup> Strontium-90; alpha spectroscopy (isotopic plutonium, isotopic thorium and americium-241); neptunium-237; gamma spectroscopy; total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

<sup>2 -</sup> Tritium; nickel-63; technetium-99

### DATA QUALITY OBJECTIVES

### Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months with analysis within 7 days of distillation for liquid scintillation counting.

All holding times were acceptable.

### Blanks

### Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the RDL, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to the laboratory blank not being analyzed with the SDG, all thorium-228, thorium-230 and thorium-232 alpha spectroscopy results in all samples were qualified as estimates and flagged "J".

All other laboratory blank results were acceptable.

### Accuracy

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is 70-130% (80-120% for gamma spectroscopy). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable

range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

### Precision

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 30 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used. If either the original or replicate value is below the CRDL, the applicable control limit is two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOWBR7) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All other duplicate results were acceptable.

### Detection Levels

Reported analytical detection levels are compared against contract required MDAs to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the contract required MDA for the following: Europium-155 in sample 80WBR1. Under the BHI statement of work, no

qualification is required. All other reported laboratory detection levels met the analyte specific MDA.

### Completeness

Data Package No. H0534 (SDG No. H0534) was submitted for validation and verified for completeness. The completion rate was 100%.

### **MAJOR DEFICIENCIES**

None found.

### MINOR DEFICIENCIES

Due to the laboratory blank not being analyzed with the SDG, all thorium-228, thorium-230 and thorium-232 alpha spectroscopy results in all samples were qualified as estimates and flagged "J". Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limit exceeded the contract required MDA for the following: Europium-155 in sample BOWBR1. Under the BHI statement of work, no qualification is required.

### REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

Appendix 2
Summary of Data Qualification

# DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE_1_0F_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228 (aspec) Thorium-230 (aspec) Thorium-232 (aspec)	J	All	Blank not run w/SDG
Tritium	J	All	No MS analyzed

# Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFO	RD			4													
Laboratory: TNU																	
Case	SDG: H	0534		<u>                                     </u>						· · · · · · · · · · · · · · · · · · ·							
Sample Number		BOWBRO		BOWBRI		BOWBR2		BOWBR4		BOWBR5		BOWBR6		BOWBR7		BOWBRB	
Location		68758		B8758		B8758		B8758		88758		88758		B8758		88758	
Remarks														Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	,
Radiochemistry	CRDL	Result	<u>a</u>	Result	Q.	Result	Q.	Result	a	Result	a	Result	Q_	Result	a	Result	0
Tritium	400	NA		NA		NA		NA		-0.033	υJ	0.005	UJ	0	บา	0.004	, w
Technetium-99	15	NA		NA		NA	_	NA.	L,	-0.026	υ	-0.107	u	-0.017	U_	-0.024	<u>, U</u>
Neptunium-237	1	0.003	U	0,003	U	0	U	0.004	υ	0.005	υ	-0.007	u_	0	U	0	<u>U</u>
Total Uranium*	1	0.532		0,464		0.419		0,181		0.314		0.480	L.	0.439		0.663	$oldsymbol{\perp}$
Plutonium-238	1	0	U	0	U	-0.009	U	0	U	0.010	U	0.005	U	0	U	0	U
Plutonium-239/240	1	0.969		0,224		0.030	υ	0.033	_	0	U	0	U	-0.036	U_	0.005	U
Nickel-63	30	NA		NA.		NA		NA.		0.292	U	-0.909	U	-1,14	U	-0.865	·υ
Americium-241	1	0.073	U	0	U	0.005	U	-0.018	U	0.012	U	-0.008	U	0.013	U	0	U
Total Strontium	1	0.827		3.88		18.1		21.8	L	24.8		19.7	L	17.2		46.9	4_
Thorium-228		0.808	5	0,699	J	0.421	J	0.468	J	0.392	٦ [	0.306	j_	0.423	J	0.502	1
Thorium-230		0.840	,	1.13	J	0.491	J	0.574	J_	0.729	J	0.596	<u> </u>	0.773	J	0.658	1
Thorium-232	1	0.791	7	0.562	3	0.358	J	0.429	J	0.337	J	0.336	J	0.234	J	0.407	ᆚ
Potassium-40		11.5		9.88		8.66		8.11		9.23		8.82		8.56		9.02	上
Cobalt 60	0,1	U	دا	U	υ	U	υ	υ	U	U	U_	U	U	U	U	<del></del>	υ
Cesium 137	0.1	7.47		2.20		U	υ	U	U	U		U	_	U	-	<del></del>	<u>llu</u>
Europium 152	0.2	U	ےا	U	כ	U	J	U	U_	U	U	υ	Ų.	U	<u>v_</u>		U
Europium 154	0.2	U	حا	U	U	U	U	U	U	U	U	U	U_	U		U	뽀
Europium 155	0.1	U	U	U	U	U	U	U'	U_	U	U	U	U	U	U	U	V.
Radium-226		0.568		0.463		0.276	L.	0.302		0.314		0.356		0.263		0.328	$\perp$
Radium-228		1.02		0,619		0.466		0.468	<u> </u>	0.469		0.447		0.478		0.580	<u>Ļ</u>
Thorium-228		0.678		0,526		0.406	L	0.372	L_	0.520		0.387		0.390	_	0.487	-
Thorium-232		1.02		0,619		0.466		0.468		0.469		0.447	Ш	0.478		0.580	4
Americium-241 (gea)		U	U	U	٦	U	٥	U	U	U	U	U	U	U	U	U	뽀
Uranium-238 (gea)		U	U	U	U	U	U	U	υ	U	U	U	υ	U	U		U
Uranium-235 (gea)		υ	ΰ	U	U	U	J	U	U	U	U	υ	U_	υ	U	U	ļυ
																	上
* - Units are mg/kg																1	1

N909117-01

DATA SHEET

BOWBRO

1	7212	Client/Case no	<u>Hanford</u> <u>SDG H0534</u>
	Kevin C. Johnson	Contract	<u>TRB-SBB-207925</u>
		Collected	BOWBRO  200 Bpond (B8758)<15' SOLID  09/14/99 12:16  B99-078-119 B99-078

ANALYTE	CAS NO	result pci/g	26 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Neptunium 237	13994-20-2	0.003	0.012	0.030		Ū	NP
Total Uranium (ug/g)	7440-61-1	0.532	0.061	0.005	1.0	K	U_T
Plutonium 238	13981-16-3	0	0.017	0.048	1.0	ับ	PU
Plutonium 239/240	PU-239/240	0.969	0.15	0.054	1.0	A.	PÜ
Americium 241	14596-10-2	0.073	0.073	0.10	1.0	σ	AM
Total Strontium	SR-RAD	0.827	0.16	0.18	1.0	8 _	SR
Thorium 228	14274-82-9	0.808	0.18	0.12	1.0	15	TH
Thorium 230	14269-63-7	0.840	0.20	0.14	1.0	JE J	TH
Thorium 232	TH-232	0.791	0.17	0.062	1.0	1	TH
Potassium 40	13966-00-2	11.5	1.0	0.65		, -	GAM
Cobalt 60	10198-40-0	ט		0.055	0.050	ซ	GAM
Cesium 137	10045-97-3	7.47	0.15	0.064	0.10		GAM
Europium 152	14683-23-9	U		0.17	0.10	ប	GAM
Europium 154	15585-10-1	ט		0.19	0.10	a	GAM
Europium 155	14391-16-3	ט		0.097	0.10	U	GAM
Radium 226	13982-63-3	0.568	0.11	0.11	0.10		GAM
Radium 228	15262-20-1	1.02	0.25	0.21	0.20		GAM
Thorium 228	14274-82-9	0.678	0.067	0.079			GAM
Thorium 232	TH-232	1.02	0.25	0.21			GAM
Americium 241	14596-10-2	U		0.067		σ	GAM
Uranium 238	U-238	U		6.6		U	GAM
Uranium 235	15117-96-1	ซ		0.18		ซ	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 14

DATA SHEET

BOWBR1

	7212 Kevin C. Johnson	Client/Case no Contract	Hanford SDG H0534 TRB-SBB-207925
i e		Collected	BOWBR1  200 Bpond (B8758)<15' SOLID  09/14/99 13:00  B99-078-119 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Neptunium 237	13994-20-2	0.003	0.023	0.042		ซ	NP
Total Uranium (ug/g)	7440-61-1	0.464	0.053	0.005	1.0	#	U_T
Plutonium 238	13981-16-3	0	0.017	0.047	1.0	ับ	υq
Plutonium 239/240	PU-239/240	0.224	0.069	0.047	1.0	#	PÜ
Americium 241	14596-10-2	O	0.038	0.091	1.0	U	AM
Total Strontium	SR-RAD	3.88	0.27	0.18	1.0		SR
Thorium 228	14274-82-9	0.699	0.16	0.12	1.0	J	TH
Thorium 230	14269-63-7	1.13	0.21	0.15	1.0	15	TH
Thorium 232	TH-232	0.562	0.15	0.061	1.0	15	TH
Potassium 40	13966-00-2	9.88	0.86	0.52			GAM
Cobalt 60	10198-40-0	ט		0.044	0.050	U	GAM
Cesium 137	10045-97-3	2.20	0.086	0.059	0.10		GAM
Europium 152	14683-23-9	ซ		0.12	0.10	U	GAM
Europium 154	15585-10-1	ซ		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.463	0.094	0.10	0.10		GAM
Radium 228	15262-20-1	0.619	0.17	0.17	0.20		GAM
Thorium 228	14274-82-9	0.526	0.056	0.055			GAM
Thorium 232	TH-232	0.619	0.17	0.17			GAM
Americium 241	14596-10-2	ט		0.11		ט	GAM
Uranium 238	U-238	υ		4.7		U	GAM
Uranium 235	15117-96-1	ซ		0.16		U	GAM

200 Area Source chrctztn-200-CW-1 OU

Re 10/00

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 15

N909117-03

DATA SHEET

### BOWBR2

7212 Kevin C. Johnson	Client/Case no Contract	Hanford SDG H0534 TRB-SBB-207925
	Collected	B0WBR2  200 Bpond (B8758)<15' SOLID  09/14/99 13:40  B99-078-119 B99-078

ANALYTE	CAS NO	resul <b>t</b> pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Neptunium 237	13994-20-2	0	0.020	0.077	-	Ū	NP
Total Uranium (ug/g)	7440-61-1	0.419	0.048	0.005	1.0	#	U_T
Plutonium 238	13981-16-3	-0.009	0.017	0.052	1.0	ับ	PU
Plutonium 239/240	PU-239/240	0.030	0.034	0.052	1.0	ט	PU
Americium 241	14596-10-2	0.005	0.029	0.053	1.0	U	AM
Total Strontium	SR-RAD	18.1	0.45	0.16	1.0		SR
Thorium 228	14274-82-9	0.421	0.13	0.13	1.0	M I	TH
Thorium 230	14269-63-7	0.491	0.16	0.14	1.0	M I	TH
Thorium 232	TH-232	0.358	0.11	0.096	1.0	7 34	TH
Potassium 40	13966-00-2	8.66	0.41	0.20		, -	GAM
Cobalt 60	10198-40-0	ប		0.020	0.050	U	GAM
Cesium 137	10045-97-3	ប		0.023	0.10	U	GAM
Europium 152	14683-23-9	T .		0.051	0.10	U	GAM
Europium 154	15585-10-1	ប		0.066	0.10	ช	GAM
Europium 155	14391-16-3	ប		0.052	0.10	ט	GAM
Radium 226	13982-63-3	0.276	0.044	0.042	0.10		GAM
Radium 228	15262-20-1	0.466	0.10	0.093	0.20		GAM
Thorium 228	14274-82-9	0.406	0.026	0.025			GAM
Thorium 232	TH-232	0.466	0.10	0.093			GAM
Americium 241	14596-10-2	ט		0.054		ט	GAM
Uranium 238	U-238	U		2.6		Ū	GAM
Uranium 235	15117-96-1	ט		0.088		U	GAM

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BOWBR4

### DATA SHEET

]	7212 Kevin C. Johnson	Client/Case no Contract	Hanford SDG H0534 TRB-SBB-207925
		Collected	BOWBR4  200 Bpond (B8758)<15' SOLID  09/14/99 15:10  B99-078-119 B99-078

ANALYTE	CAS NO	result pci/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Neptunium 237	13994-20-2	0.004	0.023	0.047		<u>"</u>	NP
Total Uranium (ug/g)	7440-61-1	0.181	0.021	0.005	1.0	<b>#</b>	U_T
Plutonium 238	13981-16-3	0	0.008	0.031	1.0	ับ ุ	PU
Plutonium 239/240	PU-239/240	0.033	0.025	0.031	1.0	4	PU
Americium 241	14596-10-2	-0.018	0.027	0.060	1.0	ับ	MA
Total Strontium	SR-RAD	21.8	0.48	0.15	1.0		SR
Thorium 228	14274-82-9	0.468	0.15	0.17	1.0	1 5	TH
Thorium 230	14269-63-7	0.574	0.17	0.18	1.0	WEST J	TH
Thorium 232	TH-232	0.429	0.12	0.059	1.0	7	TH
Potassium 40	13966-00-2	8.11	0.47	0.26		, ,	GAM
Cobalt 60	10198-40-0	ប		0.024	0.050	U	GAM
Cesium 137	10045-97-3	ซ		0.023	0.10	U	GAM
Europium 152	14683-23-9	σ		0.058	0.10	U	GAM
Europium 154	15585-10-1	U		0.080	0.10	U	GAM
Europium 155	14391-16-3	ซ		0.064	0.10	U	GAM
Radium 226	13902-63-3	0.302	0.048	0.046	0.10		GAM
Radium 228	15262-20-1	0.468	0.11	0.098	0.20		GAM
Thorium 228	14274-82-9	0.372	0.029	0.029			GAM
Thorium 232	TH-232	0.468	0.11	0.098			GAM
Americium 241	14596-10-2	ซ		0.066		U	GAM
Uranium 238	U-238	U		2.9		ប	GAM
Uranium 235	15117-96-1	ט	•	0.095		σ	GAM

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 Lab id TMANC

 Protocol Hanford

 Version Ver 1.0

 Form DVD-DS

 Version 3.06

 Report date 11/18/99

N909117-05

DATA SHEET

BOWBR5

7212	Client/Case no	<u>Hanford</u> <u>SDG H0534</u>
Kevin C. Johnson	Contract	<u>TRB-SBB-207925</u>
	Collected	

ANALYT <b>E</b>	CAS NO	RESULT pCi/g	20 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.033	0.047	0.082	400	υJ	н
Technetium 99	14133-76-7	-0.026	0.16	0.47	15	U	TC
Neptunium 237	13994-20-2	0.005	0.019	0.046		ช	NP
Total Uranium (ug/g)	7440-61-1	0.314	0.036	0.005	1.0	# -	U_T
Plutonium 238	13981-16-3	0.010	0.019	0.046	1.0	<b>#</b> 0	PU
Plutonium 239/240	PU-239/240	0	0.019	0.053	1.0	Ծ -	PU
Nickel 63	13981-37-8	0.292	1.6	2.6	30	ช	NI_L
Americium 241	14596-10-2	0.012	0.023	0.043	1.0	ŭ	AM
Total Strontium	SR-RAD	24.8	0.51	0.15	1.0		SR
Thorium 228	14274-82-9	0.392	0.13	0.12	1.0	# J	TH
Thorium 230	14269-63-7	0.729	0.17	0.14	1.0	78 J	TH
Thorium 232	TH-232	0.337	0.11	0.075	1.0	料丁	TH
Potassium 40	13966-00-2	9.23	0.67	0.36		/ -	GAM
Cobalt 60	10198-40-0	U		0.044	0.050	ซ	GAM
Cesium 137	10045-97-3	ט		0.033	0.10	U	GAM
Europium 152	14683-23-9	ט		0.080	0.10	Ū	GAM
Europium 154	15585-10-1	ט		0.13	0.10	ช	GAM
Europium 155	14391-16-3	ט		0.067	0.10	U	GAM
Radium 226	13982-63-3	0.314	0.068	0.067	0.10		GAM
Radium 228	15262-20-1	0.469	0.15	0.15	0.20		GAM
Thorium 228	14274-82-9	0.520	0.053	0.052			GAM
Thorium 232	TH-232	0.469	0.15	0.15			GAM
Americium 241	14596-10-2	ט		0.049		U	GAM
Uranium 238	<b>U-238</b>	ט		4.8		บ	GAM
Uranium 235	15117-96-1	<b>u</b> .		0.11		U	GAM

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DATA SHEET

BOWBR6

	7212	Client/Case no		но534
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925	
Lab sample id	N909117-06	Client sample id	BOWBR6	
Dept sample id	7212-006	Location/Matrix	200 Bpond (B8758) > 15'	SOLID
	<u>09/17/99                                 </u>	Collected	09/15/99 08:34	
* solids	93.4	Custody/SAF No	<u>B99-078-120</u> <u>B99-078</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.005	0.050	0.084	400	υJ	н
Technetium 99	14133-76-7	-0.107	0.11	0.42	15	σ	TC
Neptunium 237	13994-20-2	~0.007	0.015	0.046		U	NP
Total Uranium (ug/g)	7440-61-1	0.480	0.055	0.005	1.0	p	ד_ט
Plutonium 238	13981-16-3	0.005	0.019	0.037	1.0	ับ	PU
Plutonium 239/240	PU-239/240	0	0.010	0.036	1.0	ד	PU
Nickel 63	13981-37-8	-0.909	1.7	2.8	30	σ	NI_L
Americium 241	14596-10-2	-0.008	0.016	0.037	1.0	U	AM
Total Strontium	SR-RAD	19.7	0.47	0.16	1.0		SR
Thorium 228	14274-82-9	0.306	0.12	0.13	1.0	R J	TH
Thorium 230	14269-63-7	0.596	0.17	0.17	1.0	编了	TH
Thorium 232	TH-232	0.336	0.11	0.058	1.0	為了	TH
Potassium 40	13966-00-2	8.82	0.75	0.45		•	GAM
Cobalt 60	10198-40-0	บ		0.038	0.050	ט	GAM
Cesium 137	10045-97-3	ซ		0.035	0.10	U	GAM
Europium 152	14683-23-9	ט		0.092	0.10	ซ	GAM
Europium 154	15585-10-1	U		0.12	0.10	บ	GAM
Europium 155	14391-16-3	U		0.095	0.10	Ū	GAM
Radium 226	13982-63-3	0.356	0.073	0.073	0.10	•	GAM
Radium 228	15262-20-1	0.447	0.15	0.16	0.20		GAM
Thorium 228	14274-82-9	0.387	0.047	0.043			GAM
Thorium 232	TH-232	0.447	0.15	0.16			GAM
Americium 241	14596-10-2	U		0.10		ซ	GAM
Uranium 238	U-238	U		4.5		ช	GAM
Uranium 235	15117-96-1	Ū		0.13		ซ	GAM

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### DATA SHEET

BOWBR7

1	7212 Kevin C. Johnson	Client/Case no Contract	<u>Hanford</u> <u>SDG H0534</u> TRB-SBB-207925
		Collected	BOWBR7  200 Bpond (B8758) > 15' SOLID  09/15/99 08:34  B99-078-120 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2ø ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	
Tritium	10028-17-8	0	0.050	0.084	400	υJ	н	
Technetium 99	14133-76-7	-0.017	0.14	0.49	15	<b>ט</b>	TC	
Neptunium 237	13994-20-2	0	0.015	0.036		U	NP	
Total Uranium (ug/g)	7440-61-1	0.439	0.051	0.005	1.0	<b>#</b>	U_T	
Plutonium 238	13981-16-3	0	0.073	0.17	1.0	ับ	PU	
Plutonium 239/240	PU-239/240	-0.036	0.073	0.22	1.0	U	₽Ŭ	
Nickel 63	13981-37-8	-1.14	2.0	3.4	30	ซ	NI_L	
Americium 241	14596-10-2	0.013	0.026	0.033	1.0	ט	AM	
Total Strontium	SR-RAD	17.2	0.77	0.38	1.0		SR	
Thorium 228	14274-82-9	0.423	0.16	0.18	1.0	# J	TH	
Thorium 230	14269-63-7	0.773	0.20	0.19	1.0	が丁丁丁	TH	
Thorium 232	TH-232	0.234	0.11	0.099	1.0	47	TH	
Potassium 40	13966-00-2	8.56	0.35	0.16		, ,	GAM	
Cobalt 60	10198-40-0	Ŭ		0.017	0.050	U	GAM	
Cesium 137	10045-97-3	ש		0.014	0.10	ט	GAM	
Europium 152	14683-23-9	ซ		0.040	0.10	U	GAM	
Europium 154	15585-10-1	ט		0.055	0.10	U	GAM	
Europium 155	14391-16-3	บ		0.043	0.10	U	GAM	
Radium 226	13982-63-3	0.263	0.034	0.030	0.10		GAM	
Radium 228	15262-20-1	0.478	0.075	0.066	0.20		GAM	
Thorium 228	14274-82-9	0.390	0.022	0.020			GAM	
Thorium 232	TH-232	0.478	0.075	0.066			GAM	
Americium 241	14596-10-2	ซ		0.045		ซ	GAM	
Uranium 238	U-238	ט		2.0		ט	GAM	
Uranium 235	15117-96-1	ט		0.068		Ü	GAM	

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BOWBR8

### DATA SHEET

	7212 Kevin C. Johnson	Client/Case no Contract	Hanford SDG H0534 TRB-SBB-207925
1		Collected	BOWBR8  200 Bpond (B8758) > 15' SOLID  09/15/99 09:45  B99-078-121 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2ø ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.004	0.051	0.086	400	υJ	н
Technetium 99	14133-76-7	-0.024	0.16	0.49	15	U	TC
Neptunium 237	13994-20-2	0	0.025	0.051		ָד.	NP
Total Uranium (ug/g)	7440-61-1	0.663	0.076	0.005	1.0	Ø.	U_T
Plutonium 238	13981-16-3	0	0.020	0.055	1.0	'ប	PU
Plutonium 239/240	PU-239/240	0.005	0.020	0.047	1.0	ซ	PU
Nickel 63	13981-37-8	-0.865	1.4	2.4	30	ซ	NI_L
Americium 241	14596-10-2	a	0.023	0.042	1.0	บ	MA
Total Strontium	SR-RAD	46.9	1.9	0.77	1.0		SR
Thorium 228	14274-82-9	0.502	0.14	0.12	1.0	加丁加丁	TH
Thorium 230	14269-63-7	0.658	0.17	0.14	1.0	多丁	TH
Thorium 232	TH-232	0.407	0.11	0.060	1.0	# 5	TH
Potassium 40	13966-00-2	9.02	0.55	0.30		•	GAM
Cobalt 60	10198-40-0	U		0.029	0.050	U	GAM
Cesium 137	10045-97-3	บ		0.025	0.10	Ų	GAM
Europium 152	14683-23-9	ט		0.073	0.10	U	GAM
Europium 154	15585-10-1	ט		0.095	0.10	ซ	GAM
Europium 155	14391-16-3	$\boldsymbol{v}$		0.083	0.10	U	GAM
Radium 226	13982-63-3	0.328	0.049	0.047	0.10		GAM
Radium 228	15262-20-1	0.580	0.14	0.13	0.20		GAM
Thorium 228	14274-82-9	0.487	0.036	0.036			GAM
Thorium 232	TH-232	0.580	0.14	0.13			GAM
Americium 241	14596-10-2	ד		0.086		σ	gam
Uranium 238	U-238	บ		3.3		ซ	GAM
Uranium 235	15117-96-1	Ü		0.12		U	GAM

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# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

### Case Narrative

#### **GENERAL** 1.0

Bechtel Hanford Inc. Sample Delivery Group H0534 is composed of eight solid (soil) samples designated under SAF No. B99-078 with a Project Designation of: 200 Area Source characterization-200-CW-1 OU.

The samples were received as stated on the Chain-of-Custody document. discrepancies are noted on the TNU Sample Receipt Checklists. The results were transmitted to BHI via facsimile on November 2, 1999 with the exception of Thorium and Nickel-63 which were faxed to BHI on November 4, 1999, Isotopic Plutonium and Americium-241 which were faxed to BHI on November 5, 1999, and Neptunium which was transmitted to BHI via fax on November 8, 1999.

#### **ANALYSIS NOTES** 2.0

#### 2.1 **Total Strontium Analyses**

No problems were encountered during the course of the analyses.

#### 2.2 Total and Isotopic Uranium Analyses

Isotopic analyses were to be based on the results from the total uranium analyses. Isotopic uranium was not requested for any samples in this SDG. No problems were encountered during the course of the analyses. The RPD in the duplicate result and the original result was 42%, greater than the 3 sigma total allowable RPD of 32%.

#### 2.3 Gamma Spec Analyses

No problems were encountered during the course of the analyses though a recount was taken on sample BOWBR4.

#### 2.4 Isotopic Plutonium Analyses

### 2.5

No problems were encountered during the course of the analyses.

Tritium Analyses

No problems were encountered during the course of the analyses.

### 2.6

#### 2.7 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

## 2.8 Technetium-99 Analyses

No problems were encountered during the course of the analyses though recounts were performed for samples B0WBR6, B0WBR7, B0WBR8, the QC blank and the duplicate.

## 2.9 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses. A recount was performed on the QC blank due to thorium-230 detected greater than the sample MDA but less than the RDL.

## 2.10 Neptunium-237 Analyses

No problems were encountered during the course of the analyses. A recount was performed on the QC blank.

Bechtel Hanford Inc.			CHAIN OF CUSTODY/SAMPLE ANALYSIS						.	Byy-0/0-1		IA 1 1 7		
Collector Company Contact Bowers/Trice Chris Cearlock				Telephone No. Pro 372-9574 TR				Project Coordinator TRENT, SJ		Price Code	8N	Data Tu	rnaround	
Project Designation 200 Area Source characteriz	ration - 200-CW-1 O	U Sam						SAF No. B99-078				45	Days	
Ice Chest No. Field Logbook No. EL-1511					Method of Shipment Fed Ex								_	
Shipped To TMA/RECKA	19	Offiei	te Property No. A99 6255	5				Sill of Lading/A	ir Bill N	o. 679 4/	Z357	7957	957	
								COA B DC						
POSSIBLE SAMPLE HAZ	ARDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool 4C							
			Type of Container	∎G	a.G	∌G	₽G							
Special Handling and/or Sto	rage	•	No. of Container(s)  Volume	60mL	250mL	250mL	i 500mL	'						
	Sample an	IALYSIS ·		VOA - 8260A (TCL); VOA - 8260A (Add- On) {1- Propanol, Bahanol}	Semi-VOA - 8270A (TCL); 7PH-Diesel Range - WTPH-D; PCBs - 8082	Son item (1) in Special Instructions.	See item (2) Special Instruction		:					
Sample No.	Matrix *	Sample Date	Sample Time			<b>200</b>			167 1			1		
BOWBRO	Soil	9.14.99				X	-		) ower	<u> </u>	-		<del></del> -	
30WBR1	Soil	4.14.00	1 13 00			X	<del>-</del>	7	lowere		<del> </del>		· · · · · · · · · · · · · · · · · · ·	
BOWBR2	Soil	9-14-99	1340	·		X		-  G	owcho	<u> </u>	<del> </del>	<del> </del>		
HOWBR3 - CHUSCH	Soil	G 111 90	1 15 10	<u> </u>		1,					<del> </del> -			
CHAIN OF POSSESSION	3-11	Sign/Print Names Sec					SPECIAL INSTRUCTIONS See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyza for Np-237, isotopic U. Out of ICP bottle also analyza for NOZ/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.					Matrix * Soil Water*		
elinquished By 00 49 06 10 10 10 10 10 10 10 10 10 10 10 10 10	9-14.96/17 Date/Time 16/09 11:3	Received By Buck Received By ELS E	18 9-17-1 Port 9/10 1800-9/10	le Time 11:3	(1) G Gamm (Uran (2) IC Solean Vanad	amma Spectros na Spec - Add-o num) [ Isotopic ] IP Metals - 6010 num, Silver}; IC lium, Zine}; Me	copy (Cesions (America Plutonium) 0A (Supertr P Metals - ( property - 747	um-137, Cobalt-60, um-241) Scroutius Isotopic Thorium ( ace) (Arsenic, Bar 5010A (Supertrace 1 - (CV); Chromius	, Europien m-89,90 — Thorium-iem, Cadn Add-On) m Hex - 7	Total Sr[ Total 232} ] Americiu nium, Chromiu (Beryllium, Co 196	Urannum m-241 m, Lead,	Vapor Other Solid Other Liquid	•.	
LABORATORY Received By SECTION	Date/Time // 9-17-99	1:00 Received By TM M	Goldenberg	977-9 Titl			<del></del>	lable to	نبز.د	cx	·	Date/Time		
FINAL SAMPLE Disposal M DISPOSITION	ethod					Dispos	ed By		<u>.</u>				· 	

Bechtel Hanford	Inc.	(	CHAIN OF CUST	rody/s	AMPLI	E ANAL	YSIS	REQ	UEST		B99	0-078-120	<u> </u>	<b>« 1/2</b> 115/19	
Collector Bowers/Trice		Соп	npany Contact thris Cearlock	Telepho 372-9				Projec TREN	t Coordinat	or I	rice Code	8N	D.ta Tu	rnaround	
Project Designation 200 Area Source characterize	etics - 200 CW-1 OU		Sampling Location WIPM COLLECTED FROM GREATER						0.	-			45 Days		
Ice Chest No. FRC 96		Flei	d Logbook No.	lition 12	, pap	17-1	<del></del>		d of Shipme	mt L				<del></del>	
Shyoped To	08/		L-1511 site Property No.					Fed Ball of	Ex Lading/Air	Rill No.	_		·		
TMA/RECRA			A 99.025	58				i .	·-		295.	3 <i>9</i>			
					<del></del>			COA			JU,				
Possible sample haza	ARDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool 4	٦							
		. •	Type of Container	»G	aG	#G	∌G	$\neg$			†	<del> </del>			
			No. of Container(s)	1	1	1	1	<u> </u>			<del> </del>	1			
Special Handling and/or Sto	rage		Volume	60mL	250mL	250mL	500m	ւ					•		
	Sample anai	Lysis		VOA - \$260A (TCL); VOA - \$260A (A44- On) (1- Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions	See item () Special Instruction						•		
Sample No.	Matrix •	Sample Date	e Sample Time				Res.					學問題		Transfer Sta	
B8WBR4-	Soil										<u> </u>				
BOWBR5	Soil	9/15/90	0739.			×.					<u> </u>		BOW_	CRI	
BOWBR6	Soil	9/15/90	9 0834			7.					<u>                                     </u>		BOW	CRI	
BOWBR7	Soil	9/15/9	9 0834			X -		_ _			<u> </u>		BOW	CRI	
·				<u>                                     </u>							1	<u></u>	Matrix		
CHAIN OF POSSESSION	Dele/Time:	Received By	rint Names	ste/Time	See o	CIAL INSTRI chain of custody ze for Np-237, i s, Sulfides, Ami	comment sotopic U	s on SAI	of ICP bottle a	leo analy:	te for NO2/NO	3, IC	Soil , Water ' Vapor	•	
Cathia 91	15 99 1530 Date/Time	Received By		15 30 no/Time (3	lmo	Gemms Spectros ma Spec - Add-c	conv ICa	sinat-13	7. Cobalt-60, 1	woolum	-152, Europius	<b>⊷</b> 155}: . [	Other Solid Other Liquid		
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DISPOSITION											<u></u>				

Bechtel Hanford	d Inc.	C	HAIN OF CUS	TODY/S	AMPL)	E ANAL	LYSIS	REQUE	ST	] B9	9-078-12	9115/9	L " P A	
Collector Bowers/Trice	<del></del>		pany Contact ris Cearlock	Telepho 372-9				Project Coo TRENT, SJ	rdinator	Price Code	8N		urparound	
Project Designation 200 Area Source characteriz	zation - 200-CW-1 OU	Samp 200	ling Location 04 114 D B pond (B8758) >15	THAN I	COLLECTED FROM GREATER SAF No. THAN IS DEPTH 1899-078							45	Days	
	96 007		ield Logbook No.  EL-1511  Method of Shipment Fed Ex							<u> </u>	<u> </u>			
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POSSIBLE SAMPLE HAZ	ards/remarks		Preservation	Cool 4C	Cool 4C	None	Cool 4C	i						
		-	Type of Container	aG	aG	a G	вG							
Special Handling and/or Sto	rage		No. of Container(s)  Volume	f0mL	1 250mL	1 250mL	1 500mL							
	SAMPLE ANA	LYSIS	,	VOA - 1260A (TCL); VOA - 1260A (Add- On) [1- Propanal, Etheral]	Semi-VOA - 8270A (TCL); TPH-Dissel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) Special Instruction	- 1						
Sample No.	Matrix *	Sample Date	Sample Time						TEE C	où Lastin		J. N.	1 70	
B0WBR8	Soil	9/15/90	1 10945			X.	<u></u>	<u> </u>				POW/	CRI	
BOWBR9	Soll	cr	9/1799				<b> </b> -	<del> </del>			<b></b> _	ļ	<b></b>	
BOWBTO	Soil	CT 41	15/99	<u> </u>				<del></del>			<b></b>	ļ <u> </u>	<del> </del>	
BOWBT1	Soil	OF O	Urs 199				<del></del>	<del> </del>	<del> `</del>	<del>-  </del>	<b></b> -		<del> </del>	
CHAIN OF POSSESSION		Sign/Prin	it Names	·	See ci	te for No-237.	comments discrepic U. 1	on SAF B99-0 Ni-63, Tech-99	Tritium,	iamma Spec, bottle	: also	Matrix Soil Water		
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telinquished By	Date/Time   4	Received By Received By	91,000	16-99 16-99 14/Time 9-17-	Seleni Vanad DOTA	ium, Silver}; 10 Irum, Zinc}; M E. OUT O	CP Metals - ( lercury - 747 (F 614-11)	6010A (Supert 1 - (CV); Chri 11 A 5P6	race Add-Or omium Hex 	a) (Beryllium, Co	pper, Nickel,  AMALYZE			
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Appendix 5

**Data Validation Supporting Documentation** 

# RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	©	D	Ε
PROJECT: 2	٥٥-(س-		DATA PACKAGE	: HO534	1
VALIDATOR:	+-1-1	LAB: TU	J	DATE: 12/2	20/99
CASE:			SDG: HOS	34	
		ANALYSES	PERFORMED		
☐ Gross Alpha/Beta	□ Strentium-90	☐ Technetium-8\$	☐ Alphe Spectroscopy	Gemme Spectroscopy	
☐ Total Uranium	☐ Radium-22	C) Tritium	0		
SAMPLES/MATE	RIX BOU	UBRO	Bomas	1 BOW	BB Z
Bowos	= :	WBRS	BOWBR	6 Bow	BR7
Bows	28				
	<u> </u>				
					501
1. Completer	ness				AZNZA
Technical ver	rification for	ms present? .		Ye	s No N/A
Comments:		, , , , , , , , , , , , , , , , , , ,			•
COmments:					
				·	
2. Initial (	Calibration .	• • • • • •			XIN/A
	detectors cal				/
	oration accept				
	ST traceable?				
	pired?				· ·
Comments:					•
					·
					<u> </u>
			1		

A-1-2 000027

3. Continuing Calibration
Calibration checked within one week of sample analysis? Yes No N/A
Calibration check acceptable? Yes No N/A
Calibration check standards NIST traceable? Yes No N/A
Calibration check standards expired? Yes No N/A
Comments:
4. Blanks
Method blank analyzed?
Method blank results acceptable? Yes No N/A
Analytes detected in method blank?
Field blank(s) analyzed? Yes No N/A
Field blank results acceptable? Yes No NA
Analytes detected in field blank(s)? Yes No N/A
Transcription/Calculation Errors? Yes No N/N
comments: RO, RI, RZ, RY, R5, R4, R7, RT- +h 230 - T Blad
Continents. 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
154- alone UDA IN MB
5. Matrix Spikes
Matrix spike analyzed? Yes No N/A
Spike recoveries acceptable? Yes No N/A
Spike source traceable? Yes No (N/A)
Spike source expired? Yes No
Transcription/Calculation Errors? Yes No N/R
Comments: 12 3tt
3

6. Laboratory Control Samples
LCS analyzed?
LCS recoveries acceptable?
LCS traceable? Yes No N/A
Transcription/Calculation Errors? Yes No N/A
Comments:
7. Chemical Recovery
Chemical carrier added? Yes No N/A
Chemical recovery acceptable? Yes NO N/A
Chemical carrier traceable? Yes No MA
Chemical carrier expired? Yes No NA
Transcription/Calculation errors? Yes No N/A
Comments: BOWBR7 - 8 2270 weld &
PG 238 239/40 PUZ38 231/40
8. Duplicates
Duplicates Analyzed?
Comments:

9. Field QC Samples
Field duplicate sample(s) analyzed?
10. Holding Times
Are sample holding times acceptable?
Comments:
11. Results and Detection Limits (Levels D & E)
Results reported for all required sample analyses? Yes No N/A
Results supported in raw data? Yes No N/A
Results Acceptable? Yes No N/A
Transcription/Calculation errors? Yes No (N/B)
MDA's meet required detection limits? Yes NO N/A
Transcription/calculation errors? Yes No (N/A)
Comments: RO colo, 132, 154 R1 - 152, 154, 155 R2 ok
PY of R5-154 R4-154 R7-0K R4-EU-155 OFCI

# TMA/RICHMOND

SAMPLE DELIVERY GROUP HOE34

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL ALPRA EFECTROSCOFY

Client Hanford Contract TRB-SBB-207925 Case no SDG ROS34

RESULTS

Test TH Matrix SOLID

Contact Kevin C. Johnson

SDG 7212

	iae Sample ID	TRST PIX	YLANCEUT	Therium 228	Therium 230	Thorive 232	•
Proparation basch 6904-01	.0						· · · · · · · · · · · · · · · · · · ·
BOKERD	M909117-01		7212-001	0,808 J	0.549 J	0.791. J	
BOUDR1	N909117-02		7212-002	0.639 J	1.13	0.562 J	
Bowara .	M909117-03		7212-003	0.421 J	0.491 J	0.358 J	
BOVER4	N909317-04		7212-004	0.468 J	0.574 J	0.429 J	
BOWERS	<b>X9</b> 09117-05		7212-005	0.352 J	0.729 J	0.337 <i>j</i>	
BOWERS	M909117-06		7212-006	0.306 J	0.596 J	0.336 J	•
BOWER7	N909117-07		7212-007	0.423 J	0.773 J	0.234 J	
BOYBRA	N909117-06		7212-008	0.502 J	0.658 J	0.407 J	
BLK (QC ID-32081)	N909117-10		7212-010	U	D.262 3	0	Į.
LCE (QC ID=32060)	MD09117-09	•	7212-009	•	ck	a.	
	•		7212-011	ak J	ak J	ok J	

METHOD PERFORMANCE

Lient embre id	engit id	Ham Test	SUF- PIX	BCT\& NYX NOY	2 YIIQ	PREP PAC	<del>-</del>	*	EFF ¥	min min	_			Medased	ANAT-	PRINCIO
Teparation batch 6904-	010 2° Px	ep er	roz S.	O T Ref	erence	Lab I	lotebool	: 6904	PS.	010						
ONERG	W909117-61			0.14	0.250		•	88		66X		•	44	10/24/99	10/28	88-023
IONBRI.	¥909117-02			0.15	0.250			87		660			44	10/24/99	10/25	EE-031
OVER2	M909117-03			0.14	0.250					660			44	10/28/99	10/26	SS-03Z
ONBR4	<b>1909117-04</b>			0.18	0.250			94		660			44	10/24/99	10/24	84-033
OVERS	N909117-05			0.14	0.250			92		660			43	10/28/99	10/28	8\$-034
OMBRE	¥909117-06			0.17	0.250			96		659			43	10/20/99	10/24	250-23
CWBR7	X909117-07			9.19	0.250			12		659			43	10/28/99	10/28	35-036
ONERS	M909117-08			0.16	0,250			96		659			43	10/28/99	10/28	SE-030
LK (QC ID-32081)	¥909117-10			0.16	0.250					772				10/20/99	11/02	35-048
CS (QC ID=32096)	¥909117-09			0.17	0.250			91		658.				10/20/99	10/28	85-040
uplicate (#905217-05)	N909117-11			0.16	0.250			. 96		455			43	10/28/99	10/28	<b>85</b> -044
(QC TD=32082)	•				,									_		•
ominal values and limit	ts from mothe	4		1.0	0.250	,	_	20-10		200			180			

METINO SUPPLIES Page 7 DOCARY DATA SECTION Page 28

THE THE THANK Protocol Hanford Version Ver 1.0 Form DVD-OW Version 3.06 Report date <u>02/10/00</u>

Date: 21 January 2000

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 200 Area Source Characterization - 200-CW-1 Operable Unit Subject: Semivolatiles - Data Package No. H0534-RLN (SDG No. H0534)

#### INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
BOWBRO	9/14/99	Soil	С	See note 1
BOWBR1	9/14/99	Soil	С	See note 1
BOWBR2	9/14/99	Soil	С	See note 1
BOWBR4	9/14/99	Soil	С	See note 1
BOWBR5	9/15/99	Soil	· c	See note 1
BOWBR6	9/15/99	Soil	С	See note 1
BOWBR7	9/15/99	Soil	С	See note 1
BOWBR8	9/15/99	Soil	С	See note 1

<sup>1 -</sup> Semivolatiles by EPA 8270B

Data validation was conducted in accordance with the BHI validation statement of work and the 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

#### DATA QUALITY OBJECTIVES

#### Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

#### Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

## Accuracy

#### Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 70% to 130%. If spike recoveries are

outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 57% and matrix spike duplicate recovery of 57%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 59% and a matrix spike duplicate recovery of 57%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 66% and a matrix spike duplicate recovery of 67%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 62%, all 4-chloro-3-methylphenol in samples BOWBR0, BOWBR1, BOWBR2, and BOWBR4 results were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 46%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 69% and a matrix spike duplicate recovery of 69%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 57% and a matrix spike duplicate recovery of 57%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 58% and matrix spike duplicate recovery of 51%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 56% and a matrix spike duplicate recovery of 55%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 63% and a matrix spike duplicate recovery of 60%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 60%, all 4-chloro-3-methylphenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 48% and a matrix spike duplicate recovery of 57%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 64%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 53%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 63%, all 1,2,4-trichlorobenzene and hexachlorobenzene results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recovery of 66%, all pyrene, phenanthrene, anthracene, fluorathene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene and

benzo(g,h,i)perylene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

#### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the CRQL are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All sample surrogate recovery results were acceptable.

#### Precision

#### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of  $\pm$ -30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

#### Field Duplicate Samples

One pair of field duplicate samples (samples BOWBR6/BOWBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

#### Analytical Detection Levels

Reported analytical detection levels are compared against the CRQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. Under the BHI statement of work, no qualification is required.

#### Completeness

Data package No. H0534 was submitted for validation and verified for completeness. The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### MINOR DEFICIENCIES

The following minor deficiencies were found:

- Due to a matrix spike recovery of 57% and matrix spike duplicate recovery of 57%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 59% and a matrix spike duplicate recovery of 57%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 66% and a matrix spike duplicate recovery of 67%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 62%, all 4-chloro-3-methylphenol in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 results were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 46%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 69% and a matrix spike duplicate recovery of 69%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 57% and a matrix spike duplicate recovery of 57%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples BOWBRO, BOWBR1, BOWBR2, and BOWBR4 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 58% and matrix spike duplicate recovery of 51%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 56% and a matrix spike duplicate recovery of 55%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 63% and a matrix spike duplicate recovery of 60%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 60%, all 4-chloro-3-methylphenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 48% and a matrix spike duplicate recovery of 57%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 64%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene,

anthracene, fluoranthene and 2-chloronaphthalene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 53%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".
- Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 63%, all 1,2,4-trichlorobenzene and hexachlorobenzene results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate recovery of 66%, all pyrene, phenanthrene, anthracene, fluorathene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene and benzo(g,h,i)perylene results in samples BOWBR5, BOWBR6, BOWBR7, and BOWBR8 were qualified as estimates and flagged "J".

Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. Under the BHI statement of work, no qualification is required.

#### **REFERENCES**

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, 200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
   The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

## **DATA QUALIFICATION SUMMARY**

SDG: H0534	REVIEWER:TLI	1/21/00	PAGE_1_0F_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES	REASON
Phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, isophorone, pentachlorphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol 1,3,-dichlorobenzene, 1,2-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, hexachlorobutadiene, hexaclorocyclopentadiene, 4-chloro-3-methylphenol 4-nitrophenol, 2-nitrophenol, 2,4-dinitrophenol, acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene, 2-chloronaphthalene, 2-chlorophenol,	J	All	MS/MSD recovery
2,4-dichlorophenol, bis(2-chloroethyl)ether,			
bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, 4-bromophenyl phenyl ether			

## **DATA QUALIFICATION SUMMARY**

1,2,4-trichlorobenzene, hexachlorobenzene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene,	J	BOWBR5, BOWBR6, BOWBR7, BOWBR8	MS/MSD percent recovery
benzo(a)pyrene, indeno(1,2,3-c,d)pyrene benzo(g,h,i)perylene			

# Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Dist(2-Chloroethyl)ether   330   370   UJ   360   UJ   340   UJ   340   UJ   350   UJ	/99 /99 /99
Sample Number   BOWBRO   BOWBR1   BOWBR2   BOWBR4   BOWBR5   BOWBR6   BOWBR7   BOWBR5   BOWBR5   BOWBR6   BOWBR7   BOWBR5   BOWBS   BOWBR5   BOWBS	/99 /99 /99 t Q
Decision   B8758   B	/99 /99 /99 t Q
Remarks	/99 /99 /99
Sample Date   9/14/99   9/14/99   9/14/99   9/14/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/15/99   9/20/99	/99 /99
Sample Date	/99 /99
Extraction Date	/99 Q
Semivolatile (8270B)   CRQL   Result   Q   Result	Q
Phenol   330   370   UJ   360   UJ   340   UJ   340   UJ   340   UJ   350	
bis(2-Chloroethyl)ether         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ	370 UJ
2-Chlorophenol         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ         35	
1,3-Dichlorobenzene         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ         <	370 UJ
1,4-Dichlorobenzene         330         370         UJ         360         UJ         340         UJ         340         UJ         350         UJ         <	370 UJ
1,2-Dichlorobenzene       330       370 UJ       360 UJ       340 UJ       340 UJ       340 UJ       350	370 UJ
2-Methylphenol         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ         35	370 UJ
2,2'-oxybis(1-Chloropropane)       330       370 U       360 U       340 U       340 U       340 U       350 U <th< th=""><th>370 UJ</th></th<>	370 UJ
4-Methylphenol         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ         35	370 UJ
N-Nitroso-di-n-propylamine         330         370 U         360 U         340 U         340 U         340 U         350	370 U
Hexachloroethane         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ	370 UJ
Nitrobenzene         330         370 U         360 U         340 U         340 U         340 U         350 UJ	370 U
Isophorone         330         370 UJ         360 UJ         340 UJ         340 UJ         340 UJ         350 UJ	370 UJ
2-Nitrophenol 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 350 UJ 3	370 U
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	370 UJ
Z/T Digital phictor	370 UJ
1,2,4-1 ilcilioi obelizale	370 UJ
reaproduction   The contract   The c	370 UJ
	370 U
	370 UJ
T-Cillolo-3-Methylphietto	370 UJ
2-Methylnaphthalene 330 370 U 360 U 340 U 340 U 340 U 350 U 350 U 350 U 3	370 U
Hexachlorocyclopentadiene 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 350 UJ 3	370 UJ
2,4,6-Trichlorophenol 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 3	370 UJ
2.4.5-Trichlorophenol 800 920 UJ 900 UJ 860 UJ 850 UJ 850 UJ 880 UJ 870 UJ 9	20 UJ
2-Chloronaphthalene 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 350 UJ 3	370 UJ
2-Nitroaniline 800 920 U 900 U 860 U 850 U 850 U 880 U 870 U 9	20 U
Dimethylphthalate 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 3	370 UJ
Acenaphthylene 330 370 UJ 360 UJ 340 UJ 340 UJ 340 UJ 350 UJ 350 UJ 3	
2,6-Dinitrotoluene 330 370 U 360 U 340 U 340 U 340 U 350 U 350 U 3	370 UJ

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Project: BECHTEL-HANFORD				]													
Laboratory: RECRA LabNet				1													
	DG: H	0534															
Sample Number		BOWBRO		BOWBR1		BOWBR2		BOWBR4	-	BOWBR5		BOWBR6		BOWBR7		BOWBR8	
Location	•	B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			•••
Sample Date		9/14/99		9/14/99		9/14/99		9/14/99		9/15/99		9/15/99		9/15/99		9/15/99	)
Extraction Date		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99	)
Analysis Date		9/29/99		9/29/99		9/30/99		9/30/99		9/28/99		9/28/99		9/28/99		9/28/99	)
Semivolatile (8270B)	RQL	Result	<u>a</u>	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	800	920	Ū	900	U	860	U	850	U	850	U	880	U	870	U	920	U
Acenaphthene	330	370	IJ	360	IJ	340	บป	340	เกา	340	UJ	350	บม	350	UJ	370	UJ
2,4-Dinitrophenol	800	920	IJ	900	UJ	860	IJ	850	IJ	850	UJ	880	IJ	870	UJ	920	UJ
4-Nitrophenol	800	920	UJ	900		860	UJ	850	UJ	850	IJ	880	ÜÜ	870	บม	920	UJ
Dibenzofuran	330	370		360	U	340		340		340		350	U	350		370	U
2,4-Dinitrotoluene	330	370		360		340		340	_	340		350		350		370	
Diethylphthalate	330	370		360		340		340		340		350		350		370	U
4-Chlorophenyl-phenyl ether	330	370		360		340		340		340		350		350		370	UJ
Fluorene	330	370		360		360	บม	850		850		350		350			UJ
4-Nitroaniline	800	920		900			U	850		850		880	U	870		920	
4,6-Dinitro-2-methylphenol	800	920	$\overline{}$	900		860		850		850		880	_	870		920	_
N-Nitrosodiphenylamine	330	370		360		340	_	340		340		350		350		370	
4-Bromophenyl-phenyl ether	330	370		360		340		340		340		350		350		370	
Hexachiorobenzene	330	370		360		340		340		340		350		350		370	
Pentachlorophenol	800	920		900		860		850		850		880		870		920	
Phenanthrene	330	370	_	360		340		340		340		350		- 350		370	
Anthracene	330	370		360		340		340		340		350		350		370	
Carbazole	330	370		. 360		340	_	340		340		350	_	350		370	
Di-n-butylphthalate	330	370		360		340		340		18		350		350		370	
Fluoranthene	330	370	-	360		340		340		18		350		350	_	370	
Pyrene	330	370			_	340	-	340		340		350		350		370	
Butylbenzylphthalate	330	370		360		340	_	340	_	340		350		350	_	370	
3,3'-Dichlorobenzidine	330	370	_	360		340		340		340		350		350		370	
Benzo(a)anthracene	330	370		360		340		340		340		350		350		370	-
Chrysene	330	370		360		340		340		340		350		350	_	370	-
bis(2-Ethylhexyl)phthalate	330	. 370	_	360		340	_	340		340		350		350		370	
Di-n-octylphthalate	330	370		360		340		340		340		350		350		370	
Benzo(b)fluoranthene	330	370		360		340	_	340	_	340		350		350		370	
Benzo(k)fluoranthene	330	370	_	360		340		340		340		350		350		370	
Benzo(a)pyrene	330	370		360		340		340		340		350		350		370	
Indeno(1,2,3-cd)pyrene	330	370		360		340		340		340		350		350		370	
Dibenz(a,h)anthracene	330	370		360	_	340		340	_	340		350		350		370	
Benzo(g,h,i)perylene	330	370	<u> </u>	360	U	340	U	340	U_	340	<u>ul</u>	350	υJ	350	บป	370	ՄՄ
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Semivolatiles by GC/MS, HSL List

Client: TMU-HANFORD B99-878

RFW Batch Number: 9909L129

\*= Outside of EPA CLP OC limits.

Report Date: 10/26/99 14:07

Work\_Order: 10985001001

Page: 1a Cust ID: **BOMBRO** BOWBRO **BOWBRO** BOWER1 BOMBR2 BOWBR4 Sample RFW# : 001 001 MS 001 MSD 002 003 004 Information SOIL SOIL Matrix: SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 1.00 Units: UG/KG UG/KG UG/KG UG/KG UG/KG UG/KG Nitrobenzene-d5 76 ł 79 ł 76 ł Ł \* 81 88 88 1 Surrogate 2-Fluorobiphenyl 64 ŧ 1 68 65 ł ł 73 73 Ł 71 ł Recovery Terphenyl-d14 68 ¥ 70 Ł ł 73 75 ¥ 76 \* 79 ł Phenol-d5 63 Ł 61 Ł 60 ŧ 62 \* 70 ¥ 72 ł 2-Fluorophenol **57** ł 61 Ł Ł 59 ¥ 60 64 \* 63 Ł 2,4,6-Tribromophenol 58 55 56 61 ¥ ד. ט UT Phenol Ł U 57 57 360 340 340 U bis(2-Chloroethyl)ether 370 U 370 U IJ U 370 II 360 340 340 U 2-Chlorophenol 370 57 57 360 U 340 IJ ¥ 340 П 1,3-Dichlorobenzene 370 370 370 II : 360 IJ 340 U 340 U 1,4-Dichlorobenzene 370 66 67 360 U 340 IJ U 340 1,2-Dichlorobenzene\_\_\_\_ 11 370 370 Ħ 370 360 П 340 U 340 U υV 2-Methylphenol\_\_\_\_\_; υV 370 370 υV U 370 360 340 ט ע 17 340 2,2'-oxybis(1-Chloropropane) 370 U 370. U 370 17 360 IJ 340 11 IJ 340 UI 4-Methylphenol \_\_\_\_\_ UI U Z 370 370 370 U 360 UT 340 UI 340 N-Nitroso-di-n-propylamine\_\_\_\_ 370 U 100 ł 99 360 U 340 U 340 U Hexachloroethane\_\_\_\_\_ UI UI 370 []] IJ n I 340 370 370 II 360 340 Nitrobenzene\_ 370 IJ U 360 IJ .340 IJ IJ 370 370 340 UJ UJ Isophorone \_\_\_\_\_ UJ 13 340 UJ 370 370 370 360 340 2-Nitrophenol 370 U 370 Ħ П 360 U 340 Ħ 340 Ħ 370 2,4-Dimethylphenol 370 U 370 Ħ 370 П 360 U 340 TT 340 U bis (2-Chloroethoxy) methane 370 U 370 U U 370 U 360 340 U 340 U 370 U 370 U u 🗸 340 U 2,4-Dichlorophenol 370 IJ 360 340 U 1,2,4-Trichlorobenzene\_\_\_\_ 370 U 72 ł 73 1 360 U 340 u 340 13 uЛ U T Naphthalene 370 370 U 370 - 11 360 340 u T U T 340 U 4-Chloroaniline 370 370 U 370 П 360 IJ 340 U 340 IJ UJ Hexachlorobutadiene 370 UT 370 U 370 U 360 บ 3 340 υJ u T 370 UJ ł UT 340 4-Chloro-3-methylphenol 61 62 ł 360 340 UI 2-Methylnaphthalene 370 11 370 Ħ 370 Ħ 360 U 340 IJ 340 IJ Hexachlorocyclopentadiene 370 UJ 370 U 370 IJ 360 υT 340 v T 340 U T 2,4,6-Trichlorophenol UI UI 1 U U T U 370 370 370 U 360 340 340 2,4,5-Trichlorophenol UT IJ UT u T J. U. 920 920 920 Ħ 860 850

5 & Cust		OWBR		BOWBR		BOWER		Order: 1		BOWBR		age: 1b BOWBR	_
6 )	FW#:	00:	ı.	001 M	S	001 MS	D	00:	2	00	3	00	14
2-Chloronaphthalene	<del></del>	370	υJ	370	U	370	U	360	υŢ	340	<u>7</u> v	340	
2-Nitroaniline		920	ש	920		920		900	U.	860	_	850	_
Dimethylphthalate		370	UJ	370		370		360		340	υJ	340	-
Acenaphthylene 2,6-Dinitrotoluene	<del></del>	370	ชริ	370		370		360	υJ	340	υJ	340	
2,6-Dinitrotoluene	<del></del>	370	<b>ט</b>	370		370		360	ซ	340	บ	340	
3-Nitroaniline		920	บ	920		920		900	U	860		850	
3-Nitroaniline Acenaphthene		370	υJ	69	ł	69	ł	360	υJ	340		340	-
2,4-Dinitrophenol		920	υĴ	920	บ	920	-	900	υJ	860	ບໍ່ວີ	850	
4-Nitrophenol		920	υĴ	53	ł	46	*	900	υĴ	860	บัว	850	
Dibenzofuran		370	ָ דַ <u>.</u>	370	ับ	370		360	บ	340	Ü	340	
2,4-Dinitrotoluene		370	U	78	*	74	ł	360	_	340		340	-
Diethylphthalate4-Chlorophenyl-phenylether		370	U	370	Ū	370	บ	360		340	<b>U</b> .	340	
4-Chlorophenyl-phenylether		370	υJ	370	Ū	370	ซ	360	τυ	340	υŢ	340	
Fluorene		370	υJ	. 370	U	370	บ	360	υJ	340		340	
Pluorene4-Nitroaniline	<del></del>	920	U	920	Ū	920	Ü	900	ט ט	860	-	850	
4,6-Dinitro-2-methylphenol		920	ט	920	Ü,	920	_	900	Ω	860		850	-
N-Nitrosodiphenvlamine (1)		370	U	370	U	370	U	360	ซ	340	-	340	
4-Bromophenyl-phenylether	·	370	UJ	370	U	370	Ū	360	υJ	340	υŢ	340	_
HexachlorobenzenePentachlorophenol	<u> </u>	370	U	370	Ū	370	Ū	360	Ü	340	บ	340	
Pentachlorophenol		920	UJ.	59	*	59	*	900	UJ	860	υŢ	850	_
Phenanthrene		370	υJ	370,	U	370	υ.	360	υĴ	340	υĬ	340	Ū
Anthracene		370	לַ ט	370	U	370	U	360	υĴ	340	υĴ	340	U
Carbazole		370	U	370	ប	370	U	360	บ	340	ָ ט	340	U
Di-n-butylphthalate		370	ÜΣ	370	υ	370	υ	360	υJ	340	υJ	340	Ū
Fluoranthene		370	עֿט	370	ซ	370	U	360	. —	.340	UJ	340	U
Pyrene	<del></del> .	370	บ	73	ł	78	ł	`360	Ū	340	บ	340	Ū
PyreneButylbenzylphthalate		370	UJ	370	U	370	U	360	υJ	340	υŢ	340	U
3,3'-Dichlorobenzidine		370	ប	370	U-	370	U	360	U	340	บั	340	U
Benzo(a)anthracene	:	370	U	370	Ü	370	U	360	U	340	U	340	U
Chrysene		370	U	370	Ü	370	U	360	U	340	U	340	U
ois(2-Ethylhexyl)phthalate		370	υJ	370	ប	370	U	360	υJ	340	υJ	340	U
Di-n-octyl phthalate	<u> </u>	370	UJ	370	U	370	U	360	υJ	340	UJ	340	บ
Benzo(b)fluoranthene		370	U	370	U .	370	Ü	360	U	340	U	340	U
Benzo(k)fluoranthene		370	U	370		370		360	U	340	ប	340	
Benzo(a)pyrene		370	ָׁי	370	Ū	370	U	360		_	U.	340	
indeno(1,2,3-cd)pyrene		370	•	370		370		360			U	340	
Dibenz (a, h) anthracene		370	U	370	U	370		360		340	U	340	
Benzo(g,h,i)perylene		70	U	370		370		360		340		340	

### Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List

Report Date: 10/26/99 14:07 Client: TNU-HANFORD B99-078 RFW Batch Number: 9909L129 Work Order: 10985001001 Page: 2a

Cust ID: SBLKCZ SBLKCZ BS Sample RFW#: 99LE1143-MB1 99LE1143-MB1 Information SOTE Matrix: SOIL D.F.: 1.00 1.00 Units: UG/KG UG/KG Nitrobenzene-d5 96 ¥ 92 ł Surrogate 2-Fluorobiphenvl 81 ł 71 ¥ Recovery Terphenyl-d14 88 ¥ 76 Phenol-d5 74 Ł 66 2-Fluorophenol 68 67 2,4,6-Tribromophenol. 70 Phenol 330 61 ¥ bis (2-Chloroethyl) ether 330 U 330 U 2-Chlorophenol\_\_\_\_ 330 U 62 ł 1.3-Dichlorobenzene 330 U 330 U 1,4-Dichlorobenzene 330 U 75 1.2-Dichlorobenzene\_\_\_\_ 330 U 330 U 2-Methylphenol 330 U 330 U 2,2'-oxybis(1-Chloropropane) 330 U 330. 11 4-Methylphenol\_\_\_\_ 330 U 330 11 N-Nitroso-di-n-propylamine 330 U Ł 120 Hexachloroethane \_\_\_\_\_ 330 U 330 U Nitrobenzene\_ 330 U 330 U Isophorone\_\_\_\_\_ 330 IJ 330 U 2/ rolar 2-Nitrophenol\_\_\_\_\_ 330 U 330 U 2,4-Dimethylphenol 330 П 330 U 330 U 330 U bis(2-Chloroethoxy)methane 2.4-Dichlorophenol\_\_\_\_\_ 330 U 330 U 330 U 1,2,4-Trichlorobenzene 80 330 IJ 330 U Naphthalene 4-Chloroaniline 330 330 U Hexachlorobutadiene\_\_\_\_\_ 330 U 330 · U 4-Chloro-3-methylphenol\_\_\_\_\_ 330 U 74 Ł 330 U 330 U 2-Methylnaphthalene Hexachlorocyclopentadiene \_\_\_\_\_ 330 U 330 U 2,4,6-Trichlorophenol 330 U U 330 2.4.5-Trichlorophenol 840 U 840 U

\*= Outside of EPA CLP QC limits.

Cust ID: SBLKCZ

SBLKCZ BS

RFW#: 99LB1143-MB1	99LE1143-MB1
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2-Chloronaphthalene	330	υ	330	U					
2-Nitroaniline	840	U	840	ប					
Dimethylphthalate	330	U	330						
Acenaphthylene	330	U	330	ប					
2,6-Dinitrotoluene	330	U	330	บ					
3-Nitroaniline	840	ប	840	บ				•	
Acenaphthene	330	U	75	*					
2,4-Dinitrophenol	840	Ū	840	บ		•			
4-Nitrophenol	840	U	74	ŧ					
Dibenzofuran	330	υ	330	U					
2.4-Dinitrotoluene	330	U	91 *	*					
Diethylphthalate	330	U	330	ט		e.		•	
4-Chlorophenyl-phenylether	330	U	330	υ .					
Fluorene	330	U	. 330	ប	•				
Fluorene4-Nitroaniline	840	U	840	U.					
4,6-Dinitro-2-methylphenol	840	U	840	<b>U</b> ,	-				
		U	330	ט					
4-Bromophenyl-phenylether	330	U	330	. · · · ·					
N-Nitrosodiphenylamine (1)4-Bromophenyl-phenylether! Hexachlorobenzene!	330	U.	330	ט					
Pentachlorophenol	840	υ	. 69	ł					
Phenanthrene	330	U	330	J					
Anthracene	330	U	330	ני					
Carbazole	330	U	330	J					
Di-n-butylphthalate	330	Ü	330	J			,		
Fluoranthene	330	U	330	3	•		•		
Pyrene	330	U	79	<b>š</b>			•		
Butylbenzylphthalate	330	U	330	J	,		•		
3,3'-Dichlorobenzidine		U	330	J.					
Benzo(a)anthracene	330	ប	330	)					
Chrysene		U	330	3					
bis(2-Ethylhexyl)phthalate	330	U	330	I	$\sim$	6			•
Di-n-octyl phthalate		U	330	J		· }			
Benzo(b)fluoranthene		U	330	J ,	2/6/6	- \			
Benzo(k)fluoranthene		U	, 330	J .	6	<u> </u>			
Benzo(a)pyrene		U	330	j.	,				
Indeno(1,2,3-cd)pyrene	330	U	330	l ·				•	
Dibenz(a,h)anthracene		U	330	I					
Benzo(g,h,i)perylene	330	U	330	ı					

Recra LabNet - Lionville Laboratory

Client: TNU-HANFORD B99-078

RFW Batch Number: 9909L127

Semivolatiles by GC/MS, HSL List

Report Date: 10/26/99 12:36

Page: la

Work Order: 10985001001

Cust ID: BOWBR8 BOWERS BOWBRS BOWBR5 BOWBR6 BOWBR7 Sample RFW#: 001 001 MS 001 MSD 002 003 004 Information Matrix: SOIL SOIL SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 1.00 1.00 1.00 1.00 Units: UG/KG UG/KG UG/KG UG/KG UG/KG UG/KG Nitrobenzene-d5 65 ł 71 71 ¥: 84. ł 74 . \* 83 ¥ Surrogate 2-Fluorobiphenyl 64 Ł 63 ¥ 60 72 ł 70 ł 75 Ł Recovery Terphenvl-d14 72 ł 71 63 Ł 80 74 ¥ 79 ¥ Phenol-d5 59 \* 58 54 66 ¥ 59 Ł 70 Ł 2-Fluorophenol 53 Ł Ł 54 ¥ 63 53 Ł 65 Ł 2,4,6-Tribromophenol 56 59 57 61 53 67 ł ====f1 Phenol UJ 370 UT 58 ł 51 340 u T υJ 350 350 bis (2-Chloroethyl) ether 370 U 370 IJ 370 IJ 340 U 350 U 350 IJ 2-Chlorophenol 370 IJ 53 Ł 53 ٠ 340 U 350 IJ 350 U 1,3-Dichlorobenzene 370 U 370 U 370 U 340 U 350 П 350 U 1,4-Dichlorobenzene 370 U 63 60 ¥ ¥ 340 U 350 IJ 350 IJ. 1,2-Dichlorobenzene 370 U 370 17 370 U U 340 350 U 350 U II U 2-Methylphenol 370 370 Ħ 370 [7] 340 UV 350 ti U 350 UV 2,2'-oxybis(1-Chloropropane) 370 IJ 370 Ħ IJ 370 340 П 350 u 350 2,2'-oxybis(1-Chloropropane U UJ UI 370 370 IJ UI 370 11 340 350 υſ 350 N-Nitroso-di-n-propylamine 370 U 88 ŧ 95 ł IJ 340 350 Ħ 350 Ħ N Hexachloroethane\_\_\_\_\_ UT 370 UT. T  $\mathbf{u}$ UI 370 П 370 TT 340 350 350 Nitrobenzene\_\_\_\_ 370 U 370 U 370 U 340 Ħ .350 П 350 U Isophorone \_\_\_\_\_ υJ 370 II I 370 U 370 UJ IJ -340 350 U I 350 2-Nitrophenol 370 U 370 IJ 370 TŦ U 340 350 U 350 IJ 2.4-Dimethylphenol 370 U 370 U 370 IJ 340 U 350 IJ 350 U bis (2-Chloroethoxy) methane 370 U 370 Ū IJ 370 340 U 350 U 350 U υV 2,4-Dichlorophenol 370 370 U υV 370 340 350  $\mathbf{u} \mathbf{V}$ 350 υV 1,2,4-Trichlorobenzene UJ UJ 370 65 63 340 UJ 350 UJ 350 u J Naphthalene 370 370 U 370 U UI 350  $\mathbf{n} \mathbf{I}$ 340 11 1 350 4-Chloroaniline П 370 370 U 370 U IJ 340 350 17 350 U UJ UJ Hexachlorobutadiene 370 370 U 370 U τu 350 UT 350 4-Chloro-3-methylphenol UJ UT 370 61 Ł 60 UT 350 UJ 350 2-Methylnaphthalene 370 U U 370 370 IJ 340 ·U 350 U 350 Ħ Hexachlorocyclopentadiene UT 370 370 U 370 340 UT 350 UJ UJ 350 2,4,6-Trichlorophenol UJ 370 U u J UJ 370 340 350 350 UT 2,4,5-Trichlorophenol u T υJ 920 U 920 850 v T υJ 870 \*= Outside of BPA CLP QC limits.

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L.M
P

Cust II	D: BOWBR8	BOWBR8	BOWBR6	BOWBR5	BOWBR6	BOWBR7
RFWI	: 001	001 MS	001 KSB	002	003	004
2-Chloronaphthalene	370 UJ	370 U	370 U	340 U J	350 UJ	350 U
2-Nitroaniline	920 U	920 U	920 U	850 U	880 U	870 U
2-Nitroaniline Dimethylphthalate Acenaphthylene	370 U J		370 U	340 U.J	350 UT	350 U
Acenaphthylene	370 U J		370 U	340 U T	350 U T	350 0
Acenaphthylene 2,6-Dinitrotoluene		370 U	370 U	340 U	350 U	350 U
3-Nitroaniline	920 U	920 U	920 บ	850 U	880 U	870 U
Acenaphthene	370 U <u>J</u>	· · · · · · · · · · · · · · · · · · ·	64 %	340 U J	350 U T	350 0
2,4-Dinitrophenol	920 U 🛨		· 920 U	850 UJ	Z n 088	870 U
4-Nitrophenol	920 UT		57 %	850 U J	880 U Z	870 U
Dibenzofuran		370 ับ	370 U	· 340 U	350 U	350 U
2,4-Dinitrotoluene	370 U	71 %	76 %	340 U	350 U	350 U
Diethylphthalate	370 U	370 U	370 U	340 U	350 U ·	350 U
4-Chlorophenyl-phenylether		370 U	่ 370 บ	340 UJ	350 U J	350 U
Fluorene 4-Nitroaniline		370 U	370 บ	340 U J	350 U T	350 U
* *************************************	920 U	920 U	920 U	850 U	880 U	870 U
4,6-Dinitro-2-methylphenol	920 U	920 U ·	920 U	850 U	880 U	870 U
N-Nitrosodiphenylamine (1)	370 U	370 U	370 U	340 U	350 U	350 U
4-Bromophenyl-phenylether	370 ロゴ	370 ช	370 U	340 UJ	. 350 ບຸງົ	350 U
4-Bromophenyl-phenylether Hexachlorobenzene	370 UJ	370 U	370 U	340 UJ	350 U J	350 U
Pentachlorophenol	920 以丁	56	<b>55</b> %	850 UJ.	880 UJ	870 U
Phenanthrene	370 U <i>S</i> .	370 U	370 U -	340 UJ	7 ע 350	350 ປ
Anthracene	370 U J	370 U	370 U	340 U J.	350 U J	350 บ
Carbazole	370 U	370 U	. 370 U	340 U 🌮	350 U 💤	350 U
Di-n-butylphthalate	370 U丁·	370 U	370 U	18 点丁	. 350 U J	350 ປ
Fluoranthene	370 0丁.	` 370 U	370 U	340 U J	.350 UJ_	350 U
Pyrene	370 ロブ	76 🕻	66 %	~340 U J	350 U J	350 ປັ
PyreneButylbenzylphthalate		370 บ	370 U	340 U J	350 U J	350 U
3,3'-Dichlorobenzidine	370 U	370 บ	370 U	340 U _	350 U _	350 U
Benzo(a)anthracene	370 UJ	370 U	370 U	340 UJ	350 U J	350 ປີ.
Chrysene	370 U丁	370 ช	370 U	340 U J	350 U J	350 U.
ois(2-Ethylhexyl)phthalate	370 U J	370 U	370 U	340 U J	350 U T_	350 U,
Di-n-octyl phthalate	370 UJ	370 U	370 U	340 U 🎵	350 U J	350 ປ
Benzo(b)fluoranthene	370 UJ	370 U	370 บ	340 UJ	350 V J	350 ປ
Benzo(k)fluoranthene	370 UJ	370 บ	370 U	340 U J	350 U J	350 U
Benzo(a)pyrene	370 以了		370 บ	340 U T	່ 350 ບຸຽົ	350 บ
Indeno(1,2,3-cd)pyrene		370 U	370 U	340 U J	350 U J	350 U
ibenz(a,h)anthracene		370 U	370 U	340 U	350 U	350 ປັ
Benzo(g,h,i)perylene		370 U	370 U	340 U J	350 U J	350 U

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, HSL List

Report Date: 10/26/99 12:36 RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2a

	Cust ID:	SBLKCZ	SBLKCZ BS	
Sample		99LE1143-MB1	99LB1143-MB1	
Information	Matrix:	SOIL	SOIL	
	D.F.:	1.00	1.00	
	Units:	UG/KG	UG/KG	
	Nitrobenzene-d5	96 🖁	92 %	
Surrogate	2-Fluorobiphenyl	81 %	71 %	
Recovery	Terphenyl-d14	88 %	76 %	
	Phenol-d5	74 %	66 😵	
	2-Fluorophenol	68 😮	67 🕏	
	2,4,6-Tribromophenol	74 %	70 %	
=======================================		fl	======f]	======fl=====fl=====fl=====fl======fl
Phenol		_ 330 U	61 %	•
	thyl)ether	_ 330 U	330 U	
2-Chloropheno		_ 330 U	62 🕻	
<del>-</del>	enzene	_ 330 U	330 U	2/10 G
	enzene	_ 330 U	75 <b>%</b>	
1,2-Dichlorobe		_ 330 U	330 U	
2-Methylphenol		. 330 U	330 U	$\supset$ $\nearrow$
	-Chloropropane)	330 U	330, U	
4-Methylphenol		_ 330 ປ	330 U	
	n-propylamine	. 330 Ü	120 %	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	ne		330 U	
Nitrobenzene	<u> </u>	. 330 U	330 U	•
		330 ປ	330 U	
2-Nitrophenol_		330 U	330 U	
2,4-Dimethylph		330 ປ	330 U	•
bis(2-Chloroet	:hoxy)methane	330 U	330 U	•
2,4-Dichloroph	nenol	330 U	330 U	
	obenzene	330 U	80 🕻	•
Naphthalene		330 U	330 U	
4-Chloroanilin	ıe	330 U	330 U	
Hexachlorobuta	diene	330 U	330 U	
4-Chloro-3-met	hylphenol	330 U	74 %	
2-Methylnaphth	alene	330 U	330 U	
Hexachlorocycl	opentadiene	330 U	330 U	
2,4,6-Trichlor	ophenol	330 U	330 บ	
2,4,5-Trichlor		840 U	840 U	
	TD3 GTD OG 31-14-			

\*= Outside of EPA CLP QC limits.

Cust ID: SBLKCZ

SBLKCZ BS

DRW#.	901.E1143_MR1	99LE1143-MB1
venat	) <u> </u>	ユュアティナチフ - MDT

· ·	•						
2-Chloronaphthalene_	330	U	330 U	<del></del>	<del></del>		
2-Nitroaniline	840	U	840 U				
Dimethylphthalate	330	Ū	330 U				
Acenaphthylene	330	Ū	330 U				
2,6-Dinitrotoluene	330	Ū	330 U				
3-Nitroaniline	840	U	840 U				
Acenaphthene	330		75 <b>%</b>				
2,4-Dinitrophenol	840	U	840 U		2		
4-Nitrophenol	840	U	74 %	· /			
Dibenzofuran	330	U	330 U		10/00		
2,4-Dinitrotoluene	330	U	91 * *	$\supset$	/		
Diethylphthalate	330	U	330 U		[[0]		
4-Chlorophenyl-phenylether	330	U	330 U	•.			
Fluorene	330	Ū	330 U	•	•	*	
4-Nitroaniline	840	U	840 U				
4,6-Dinitro-2-methylphenol	840	U	840 U				
N-Nitrosodiphenylamine (1)	330	U	330 U				
4-Bromophenyl-phenylether	330	U	330 U				
Hexachlorobenzene	330	U	330 U				
Pentachlorophenol	840		69 🖁		•		
Phenanthrene	330		330, U				
Anthracene	330		330 U			•	
Carbazole		Ū	330 U			•	
Di-n-butylphthalate		Ū	330 U				
Fluoranthene	330	U .	330 U		• •		
Pyrene	330		79 %				
Butylbenzylphthalate	330		330 U			•	
3,3'-Dichlorobenzidine	330		330 U				
Benzo(a)anthracene	330		330 U		•		
Chrysene	330		330 U			•	
bis (2-Ethylhexyl)phthalate		U	330 U				•
Di-n-octyl phthalate		Ū	330 U				
Benzo(b) fluoranthene	330		330 U				
Benzo(k) fluoranthene	330		330 U				
Benzo (a) pyrene	330		330 U				
Indeno(1,2,3-cd)pyrene		U	330 U				
Dibenz(a,h)anthracene	•	U	330 U				
Benzo(g, h, i) perylene	330	U	330 U	or - og 2 : 1-			
(1) - Cannot be separated from Diph	enylamine.	. *=	Outside of BPA	CLP QC limits.			

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Chemical and Environmental Measurement Information

#### Recra LabNet Philadelphia Analytical Report \*\*DEVICION\*\*

Client: TNU-ILANFORD B99-078

W.O. #: 10985 001 001 9999 00

RFW#: 9909L127

Date Received: 09-17-99

01-17-60 Date

SDG/SAF #: H0534/B99-078

#### **SEMIVOLATILE**

This narrative was corrected to add the TIC search for Tributy/phosphate.

Four (4) soil samples were collected on 09-15-99.

The samples and their associated QC samples were extracted on 09-20-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Methods 8270B for TCL Semivolatile target compounds on 09-28-99.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding times for extraction and analysis were met.
- 3. A non-target compound was detected in sample BOWBR8.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. All matrix spike recoveries were within EPA QC limits.
- 6. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
- 7. These samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the samples.

Vice President

Philadelphia Analytical Laboratory

pottgomphissibhulsac09:27.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage; All pages of this report are integral parts of the supplying data. Therefore, this report should only be reproduced in its entirety of 16 pages.

208 Weish Pool Road - Lionville, PA 19341-1333 - (610) 280-3000 - Fax (610) 280-3041



Chemical and Environmental Measurement Information

# Recra LabNet Philadelphia Analytical Report \*\*REVISION\*\*

Client: TNU-HANFORD B99-078

**RFW#:** 9909L129

SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00

Date Received: 09-17-99

#### **SEMIVOLATILE**

This narrative was corrected to add the TIC search for Tributylphosphate.

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were extracted on 09-20-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Methods 8270B for TCL Semivolatile target compounds on 09-28,29,30-99.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding times for extraction and analysis were met.
- 3. Non-target compounds were detected in the samples.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. All matrix spike recoveries were within EPA QC limits.
- 6. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
- 7. These samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the samples.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

pef/gorup/data/bna/mu09129.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of

the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.

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# Appendix 5 Data Validation Supporting Documentation

#### WHC-SD-EN-SPP-002, Rev. 2

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(5)	D	Ε
PROJECT: 2	00-cw -		DATA PACKAGE	: Hoss.	<i>p</i>
VALIDATOR:	+41	LAB: Re	CRA	DATE: 12	2/0/00
CASE:		<b>,</b> 	SDG:	HO534	,
		ANALYSES	PERFORMED		
CLP Volatiles	SW-846 8240 (cap column)	SW-846 8260 (packed column)	CLP Semivolatiles	SW-846 8270 ((cap column)	SW-846 (packed column)
Is technical Is a case nar Comments:  2. HOLDING 1 Are sample ho		TESS AND CASE documentation at?	NARRATIVE n present?		Yes No N/A Yes No N/A
	<u></u>			· · · · · · · · · · · · · · · · · · ·	

### WHC-SD-EN-SPP-002, Rev. 2

### GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION	$\langle \bigcirc$
Is the GC/MS tuning/performance check acceptable? Yes	No N/A
Are initial calibrations acceptable? Yes	No N/A
Are continuing calibrations acceptable? Yes	No N/A
Comments:	
•	
4. BLANKS	
Were laboratory blanks analyzed? Yes	No N/A
Are laboratory blank results acceptable? Yes	No N/A
Were field/trip blanks analyzed? Yes	$(N_0)$ N/A
Are field/trip blank results acceptable? Yes	NO MTA
Comments:	$\underline{\hspace{1cm}}$
5. ACCURACY	
Were surrogates/System Monitoring Compounds analyzed? (Yes)	No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? (Yes)	No N/A
Were MS/MSD samples analyzed? Yes	No N/A
Are MS/MSD results acceptable? Yes	Mo N/A
Comments: 7 am - Jall 1-4	
9 over - Jall S-8	

000033

#### WHC-SD-EN-SPP-002, Rev. 2

#### GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION	
Are MS/MSD RPD values acceptable? Yes	lo N/A
Are field duplicate RPD values acceptable?	lo N/A
Are field split RPD values acceptable? Yes	lo (N/A)
Comments:	<del></del>
	<del></del>
<u> </u>	
7. SYSTEM PERFORMANCE	<del>`</del> _
	No M/A
	No N/A
	No NA
Comments:	_
8. COMPOUND IDENTIFICATION AND QUANTITATION	
Is compound identification acceptable? Yes	No ( N/A
Is compound quantitation acceptable? Yes	No N/A
Comments:	
	<del></del>
	<del></del>
9. REPORTED RESULTS AND QUANTITATION LIMITS	
Are results reported for all requested analyses? Yes	No N/A
Are all results supported in the raw data? Yes	No. N/A
Do results meet the CRQLs? Yes	$\rightarrow$
Has the laboratory properly identified and coded_all TIC? Yes	No N/A
Comments: all samply - and one	

Review Comment Record (RCR)					l. Date 2/03/00	2. Review No. BHI/QA0014	
					3. Project 200-CW-1	4. Page Page 1 of 1	3
5. Doc	urnent Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviews	er .	8. Organization/Group	9. Location/P	hone
] (		200 Area Source Characterization – 200- CW-1 Operable Unit	clerization - 200-		BHI/QA	H0-16/372-9	208
, Com	ment Submitted Appenval:	10. Agreement with indicated o	comment disposit	ion(s)	II. CLOSED	100	B
Orga	nization-Manager (Optional)	Date Rev	icwes/Point of Co	polari	Job, 25,00	Reviewed Total of Cont	logo lad
		Aud	vorMinimeter		<b>-</b>	Author/Originator	
12 ke n		Provide technical justification for the stion of the action required to correct/ dicated.)	14. Hold Point	15. Dispo	sition (Provide justification if N	OT sccepted.)	16. Stat
	for the qualifiers. The validation propies data validation supporting de	ckages had the supporting documentation continues calls to include submittation ocumentation as part of the validationed hold time information, out of criterial data, etc.		In duded	t cases the blank of the form I is light propriete in Sormotion	n other coses	
V	PCB: Page 010, indicates the CRD the units to be UG/KG. The CRDL	L to be 0.1 with the heading indicating for PCB should be 100 UG/KG. This hat the laboratory exceeded the detection		رمح	recteel		
<i>7</i> :		cceptance criteria do not reflect projec LL 99-07.		Carre	etal par non s	undles -	
/3	range is 70 to 130%. This should re	cy specifies the matrix spike recovery ead matrix spike recovery range is 70 to opes determined by GaLi/HPGe recove the project documents.	ry.	Carre	In par your	judelnes -	
	Radiochemistry: Page 003, Precipio whereas, project documents has accommented to the comments of the comments	on indicates acceptable RPD to be 35% eptance for precision to be 30%.	;	carr	rectel per ver	n guel from	
15	Radiochemistry: page 010 needs a. Total IJ is in MO/KG.	statement at bottom data indicating tha	!	Carr	ested	U	

	Review Comment Record (RCR)			I. Date 2/03/00	2. Review No. BHI/QA0014	
				3. Project 200-CW-1	4. Page Page 2 of 3	
12.	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Hold Point	15. Di	sposition (Provide justification	if NOT accepted.)	16. Statu
76	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different than those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 will need reviewed.		can	real per new	aully	+
7	Radiochemistry: Page 901 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-87 draft B.		رم	racted par	neur guille	-
	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.		رمم	rected per neur	a moleling -	F
<b>1</b>	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.		رها	retil	0	
V10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.		car	rectal par new	e queletres.	F
111	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		car	rected from nu	gudelm -	
√12 	Volatiles: The detection limits tisted on page 011 do not meet the project PQL on the majority of the compounds.		car	rether par new	or gurlela -	
אל	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Con	etit per neur	milden /	1
V	Semi-Volatiles: Project documents call for the defermination of tri-buryt phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.		R.	Wiess Resolution	~	
15	Semi-Volatiles: Page 011 for SDG in the header has H0506, this should be H0534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.		Car	rect		
16	Inorganics: Again the accuracy and precision acceptance criteris do not reflect project requirements. Using the project acceptance criteris for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.		Carr	ected per new	quelelnes -	
V17	lacrgmics: Page 010 the heading at the top of the page indicates the units				σ	

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_	Review Comment Record (RCR)	į	1. Date 2/03/00	2. Review No. BHI/QA0014		
·				3. Project 200-CW-1	4. Page Page 3 of 3	
12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Hold Point	IS. Dis	sposition (Provide justification i	( NOT accepted )	16. Statu
	for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.			recto		3.6.0
<b>48</b>	Inorganic: Page 010 most of the CRDL listed are not what the project required.			A-A	r gudliss -	
V	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.	•	12m	guidelnes were deste remudio	e submitted	

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#### Validation Package Review - 200-CW-1 Packages - RL Weiss

Package H0509 - No comments

Package H0534 - No comments

Package H0590 - No comments except

Semivolatile, Pg. 4 & 5, "Analytical Detection Levels"; Wording should be that all nondetects failed to meet detection limits specified by the CRDL. See wording in similar sections of H0506 & H0534.

already corrected - corrections of

	Review Cor	nment Record (RCI	R)		l. Date 2/03/00	2. Review No. BHI/QA0014		
	·.				3. Project 200-CW-1	4. Page Page I of	3	
5. Doc	aument Number(s)/Title(s)	6. Program/Project/ Building Number	7. Review	i	8. Organization/Gru	up 9. Location/	Phone	
SDG No. H0534 200 Area Source Characterization - 200- CW-1 Operable Unit			Claude St	сеу	BHI/QA	H0-16/372-	H0-16/372-9208	
l. Con	nment Submitted Appeaval:	10. Agreement with indicated	comment disposi	ion(s)	II. CLOSED			
Cis	se ization Manager (Optional)	Date	viewed/Point of C	pilari	Date	Reviewes/Point of Co	elaci	
	·	Aw	thor/Originator			Author/Originator		
12 ke v		Provide technical justification for the ation of the action required to correct/ idicated.)	l 4. Hold Point	15. Disp	osition (Provide justification if	FNOT accepted.)	16. Statu	
	General Comment: None of the parties of the parties. The validation properties data validation supporting a	ickages had the supporting documental procedures calls to include submittal of locumentation as part of the validation ed hold time information, out of criteri		I w clude	st cases the blank id on the Form I's. ppropriate in Sormot	In Other coses		
	the units to be UG/KG. The CRD would also change the conclusion - limits on page 004.	OL to be 0.1 with the heading indicating L for PCB should be 100 UG/KG. This that the laboratory exceeded the detect	ion .	رعم	rected			
2	PCB: The accuracy and precision requirements as specified in DOB/	acceptance criteria do act reflect proje RL 99-07.	ct	Carr	rected par new	qualles -		
3	range is 70 to 130%. This should	ncy specifies the matrix spike recovery read matrix spike recovery range is 70 topes determined by GaLi/HPOc recov in the project documents.	to	Carre	etel per rour	gudelnes.		
4	Radiochemistry: Page 603, Precie whereas, project documents has ac	ion, indicates acceptable RPD to be 35% ceptance fer precision to be 30%.	<b>%</b> ;	car	rectel per n	en gud fr	,	
5	Radiochemistry: page 010 needs a Total II is in MG/KG.	statement at bottom data indicating th	a(	Car	rected	<u> </u>		

	Review Comment Record (RCR)			i. Date 2/03/00 3. Project 200-CW-1	2. Review No. BHI/QA0014 4. Page Page 2 of 3	
I2.	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Floid Point	IS. Die	sposition (Provide justification	if NOT accepted.)	16. Statu
6	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed as pages 004 will need reviewed.		car	rectif per new	oulln -	<del> </del>
7	Radiochemistry: Page 001 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-07 draft B.	·	car	rected per r	eur gulle	-
8	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.		رمم	rected per neur	Sudeling -	F
9	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.		رم	rectal	d a	
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.		car	rectal par new	queletre.	F
l I	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.			rectal par mur	0.0	
12	Volatiles: The detection limits tisted on page 011 do not meet the project PQL on the majority of the compounds.		cas			
13	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Con	etit on new a	milden V	1
14	Semi-Volatiles: Project documents call for the determination of tri-buryt phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-buryl phosphate in the validation package.		R.	Wiess Resolution	~	
15	Semi-Volatiles: Page 011 for SDG in the header has \$10506, this should be \$10534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.		Cour	rect		
16	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements. Using the project acceptance criteria for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.		Carr	etel per neur	genelelnes -	
17	Inorganics: Page 010 the heading at the top of the page indicates the units			·		1

	Daniell Comment Decord (DCD)		1. Date	2. Review No.	
	Neview Comment Necola (New)		2/03/00	BHI/QA0014	
<del></del>			3. Project	4. Page	•
			200-CW-1	Page 3 of 3	
12. Teg	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct!	I.4. Hold		·	79
			15. Disposition (Provide Justification if NOT accepted.)	NOT accepted.)	Selection
	J/KG; whereas, the inhormory data sheets indicate the		76		
	DEP SE MUNIC.		Car O Weerly		
<b>=</b>	Inorganic: Page 010 most of the CRDL fisted are not what the project required.		carrected per pring	- siller	
				O	
	It would appear that the validator either do not have the project specific	.·	Wen quichers were so	Sobmitted	
	the validation.		+ the debe remode	Ve Jeel.	

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Chemical and Environmental Measurement Information

# Recra LabNet Philadelphia Analytical Report \*\*REVISION\*\*

Client: TNU HANFORD B99-078

**RFW** #: 9909L127

SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00

Date Received: 09-17-99

#### GC SCAN

This narrative was revised to remove references to Butanol and add references to 1-Propanol and to clarify surrogate information.

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and 1-Propanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding time for analysis was met.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.
- 6. The blank spike recovery was within advisory control limits of 50%-150%.
- 7. All matrix spike recoveries were within advisory control limits of 50%-150%.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

r:\share\lc\gesean\09-127.doe

<u>)/-0)-00</u> Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 7 pages

#### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0534 - Rad

Due to the blank analysis being conducted 5 days after the SDG, all isotopic thorium results will be qualified as estimates and flagged "F".

Due to all QC samples being prepared 4 days after the SDG, all neptumium-237 results will be qualified as estimates and flagged "J".

Procede with validation R2 Nov 1-5-80

#### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Dunean

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

110534 - Wet Chem

The chain of custodies included in the wet chem package do not list wet chem as a requested analysis:

Please note "Special Instructions" section of COC. Validate as

normal

12 Weer 1-5-00

Bechtel Hanford	C	CHAIN OF CUSTODY/SAMPLE ANALYSIS I				REQUEST		9-078-119	Page 1 of 1			
			Company Contact Telephone No. Chris Cearlock 372-9574			Project Coordinator TRENT, SJ	Price Code	8N		maround C		
Project Designation 200 Area Source characterize		0-m-  m-8				SAF No. B99-078	į		45	Days `		
Ice Chest No. ERC 96	ERC 96 065 EL-1511 Fed Ex											
Shipped To TMA/RECRA 0 36 9~14-99			te Property Na. 199 <i>025</i> 7					Bill of Lading/Air Bill 1 4235 79 COA 1 20 CU		550		
				· 			<b></b>	COA 9 20 CH	1 671			
Possible sample haza	RDS/REMARKS		Preservation	Cool 4C	Cool 4C	None	Cool 44	c				
			Type of Container	∎G	<b>₽</b> G	#G	₽ <b>G</b>					
Special Handling and/or Store	age		No. of Container(s)  Volume	f0mL	1 250mL	250mL	1 \$00mI					
	Sample and	LYSIS	:	VOA - \$250A (TCL); VOA - \$260A (Add- On) {1- Propenol, Ethenol)	Semi-VOA - 8270A (TCL) TPH-Dissel Range - WTPH-D; PCHe - 8082	See item (1) in Speciel Imprections.	See item (2 Special Imagraction					
Sample No.	Matrix *	Sample Date	Sample Time							\$		
BOWBRO	Soil	9.14.99		X	X_	ļ	X	Bowe	0			
IOWBR1	Soil	4.14.9		<u> </u>	X	<u> </u>		Dowc	<b>K</b> 0			
IOWBR2	Soil	9.14.99	1340		X		X	Bowc	RO			
OWERS CHILDE	Soil	9.14.90	1 15 10		1,			<del>-  </del>	<del>- </del> -	<del>  </del>		·
CHAIN OF POSSESSION	<u> </u>	Sign/Pris	nt Names	te/Time	Sec o	ze for Np-237,	comments	on SAF B99-078. Out of G	enma Spec, bottle	e alao 3, 1C	Matrix * Soil Water	·
Borne Bowne 9.17-79/1700 R. F 1B 9-19.99 Relinquisted By Peter 1B 9/1699 11:30 Been Ports 9/16				1/700 10 Time 10 11:30 10 Time 1:30	2 (1) General Spectroscopy {Cesism-137, Cobelt-60, Europium-152, Europium-155}; General Spectroscopy {Cesism-141}; Strontium-159,90 — Total Sr; Total Uranism {Uranism}; isotopic Plutonium; isotopic Thorium (Thorium-232); Americium-241 (2) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead,							
Brent Grand By Land By Roceived By	7-17-94 :02	Received By	gross allula	M:34  Me/Time  Fig 024  Total	Vana	ilium, Zinc); M	erctery - 74	71-(CV); Chromium Hex-			le/Time	
SECTION  TNAL SAMPLE Disposal Med DISPOSITION	dad					Dispos	ed By	<del></del>		Dat	e/Time	

Data Package	IR .	
H0472	Rad MS ¥	
<u></u>		
H0475	Rad MS 💥	
H0473	Rad MS 💥	
H0538	Rad MS →	
	Rad - New Form 1s list liquid versus solid matrix	
H0542	Rad MS 🐒	
H0544	Rad MS %	
	Metals - Case narrative states that only 1 sample was	
	analyzed (two were analyzed)	
H05 <b>51</b>	Rad MS ¥	
H0514	CR VI - Method of analysis not identified	
H05 <b>06</b>	Samples not listed in VSR	
	Rad MS X	
	Alcohols - Surrogate not run?	
H0534	Samples not listed in VSR	
	Was nickel, 3H and TC-99 analysis to be conducted	
	on samples BR0, BR1, BR2, BR4?	
	Rad MS X	
	PCBs - What do you want for CRDLs	
	alcohols - no surroyatil	
	MS/MSD for UOA	

L BROIBRI, BRZ 1BR4 - Case necretion of States
that the associated MS/MSD is the one for the
other samples in the SDG-But they were not
run together.

Brace

Brace with validation for all "Red Mr" group

I lend if ind above (\*) and with missing alaskal surregular

(D) identified above

Richard Weiss

### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534-Rad

No indication of a matrixspike foe 311 & C-14.

### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management 3190 George Washington Way

MSIN: H9-03 Phone: 375-9439 FAX: 372-9487

# BHI Sample Management

# Fax

То:	BRUCE	Chri	stian	From:	Jeans	ette	Duncan
Fax:	375 -	5151		Pages:			
Phone	);		<u> </u>	Date:	12/20/	199	
Re:				CC:			
□ Urg	ent 🗆 For	Review	□ Please C	Comment	☐ Please Repl	<b>y</b> [	] Please Recycle
• Con	nments:					· <u> </u>	
BR	uce -	this	show	ed to	the care	. 0	the ummarry
Mis	ssing l	RC il	nto t	Rom	Sample	<u>, , , , , , , , , , , , , , , , , , , </u>	ummaky
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17	doesn	4-	Je	nett			
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Sample ID Type	Location
B0W679 EQ	GP-3
B0W8W0 EQ	GP-8
B0W9P1 EQ	GP-12
BOWCP8 EQ	B8758
BOWLM4 EQ	BP-3
BOWLM3 EQ	BP-1
BOWNX3 EQ	. TP-2
B0WNX1 EQ	TP-1
BOWNX7 EQ	BP-7
BOWNX9 EQ	BP-9
B0X487 EQ	B8757
Sample ID Type	Location
B0W680 TB	GP-3
B0W8W1 TB	GP-8
B0W9P0 TB	GP-12
BOWCP9 TB	B8758
BOWLM5 TB	BP-3
BOWLM2 TB	BP-1
BOWNW6 TB	BP-7
BOWNW8 TB	BP-9
BOWNXO TB	TP-1
B0WNX2 TB	TP-2
B0X3V9 TB	B8757
Sample ID Type	Split of Location
BOW5P8V SPLIT	B0W5P7/ GP-3
BOW8B1/ SPLIT	B0W894/ GP-8
BOW9H9 SPLIT	B0W9K0 / GP-12
BOWBR3 SPLIT	B0WBR2/B8758
BOWKVC) SPLIT	BOWKX1/BP-3
BOWKT9 SPLIT	BOWKV1 /BP-1
BOWMM8 SPLIT	B0WMH1 TP-3
BOWMM6 SPLIT	B0WMD1/JP-1
BOWMM2 SPLIT	B0WMX1√BP-7

QA 1 in 20 or 5% two collocates per waste site one per borehole

BOWMM4 SPLIT	B0WN01 BP-9
B0XN26 SPLIT	B0XN21 B8757
Sample ID Type	Dup of Location
BOW681 J DUP	B0W5P7 J GP-3
B0W895 . DUP	B0W894 J GP-8
B0W9K1 DUP	B0W9K0 / GP-12
BOWBR7/DUP	B0WBR6/B8758
B0WKX2/DUP	BOWKX1 BP-1
B0WKV2√ DUP	B0WKV1 ✓BP-1
B0WMX2/DUP	B0WMH1/TP-3
B0WN02 DUP	B0WMD1/TP-1
B0WMD2/DUP	B0WMX1 BP-7
B0WMH2 DUP	B0WN01 BP-9
B0X <del>N22</del> DUP	B0X <del>N21</del> B8757
MNJA	Myai

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**ERRORS** 

1) HANG UP OR LINE FAIL

2) BUSY

3) NO ANSWER

4) NO FACSIMILE CONNECTION

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHi Sample Management 3190 George Washington Way

MSIN: H9-03 Phone: 375-9439 FAX: 372-9487 **BHI Sample Management** 



Tot	BRUCE Christian	From	Jeanet	e Duncan
Fax	375-5151	Pagesi	3	
Phone		Date:	12/20/9	7
Res		CC:		
			Talante Hank	□ Pleasa Recycle

#### Duncan, Jeanette M

From: Kessner, Joan H

Sent: Wednesday, December 22, 1999 7:54 AM

To: 'orlette'

Cc: Duncan, Jeanette M

Subject: validation help

#### Orlette---

Good morning. I need some help answering our validators questions (usually Rich does this and knows if the requests make sense or not----so if the requests are of a "goat" nature just consider the source..........)

- H0544 (metals): The case narrative states incorrectly that only one sample was
  analyzed. Please correct the case narrative and resubmit. (One thing our other
  lab has started to do is put a revised call out in the case narrative discussing
  what change was made and why----is that something you could do when these kind
  of questions come up?? From our perspective it is really helpful.)
- H0506 (alcohols): No surrogate information is present. Were surrogates run?
   (Guidelines call for them......this is what my validator thinks I don't have a clue.)
- H0534 (alcohols): No surrogate information is present.....
- H0534 (voa): The case narrative for samples BOWBRO, BOWBR2 and BOWBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SDG). This is unlikely since the analysis were conducted several days apart (see pages 11 and 13). Are the analysis dates wrong or the other MS/MSD data?? I have not a clue about this......

I hope this makes senses. Please let me know when you think we will get the answers......

Have a great holiday!!

Joan

### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 & 110505-PCB

What values do you want me to use for CRDLs?? No indication of a matrixspike foe 3H & C-14.

# TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - Alcohols

No surrogate information is present. Were surrogates run? (Guidelines call for them)

# TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - Alcohols

No surrogate information is present. Were surrogates run? (Guidelines call for them)

### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples BOWBRO, BOWBR1, BOWBR2 and BOWBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

## TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534-Rad

No indication of a matrixspike foe 311 & C-14.

# TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 17 December 1999

Information Request

H0534

The samples are not listed in the VSR.

#### Duncan, Jeanette M

Todd, Mary E Wednesday, March 15, 2000 1:18 PM Duncan, Jeanette M validation reports

From: Sent: To: Subject:

Jeanette,

We do not have any comments on the validation packages. We will support the comments from Rich.

Thanks

Mary & Chris

#### TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncari

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data?

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

-- Pages: 1

Date: 20 December 1999

Information Request

H0534 & H0505-PCB

What values do you want me to use for CRDLs??

No indication of a manuaspike for 3H & C. 145

DL Requirements table
attached

H/M 1-18-08

#### DOE/RL-99-07 Draft B

Table A2-2. Anal	ytical Performance R	eauirements - Dee	p Zone Soils.	(2 Pages)

Data Analytical Type Method		Analyte	Preliminary Action Level		Detection Requiren		Accuracy Required	Precision Required	
rype	Method		Action Level		MDL	PQL	Medanea	rednited	
		Radio	nuclides, in		198				
Rad, α	GeLi/HPGe	Americium-241	- · · 3	] 0.			80-120	±30	
	AmAEA*			0.			70-130	±30	
Rad, y	GeLi/HPGe	Cesium-137	7			0.1	80-120	±30	
Rad, y	GeLi/HPGe	Cobalt-60	1	0.	05	0.1	80-120	±30	
Rad, y	GeLi//HPGe	Europium-152		0.	1	0.2	80-120	±30	
Rad, γ	GeLi/HPGe	Europium-154	1	0.	1	0.2	80-120	±30	
Rad, γ	GeLi/HPGe	Europium-155	1	0.	.05	0.1	80-120	±30	
Rad, α	NpAEA*	Neptunium-237	<del></del> -j	0	.1	i	70-130	±30	
Rad	Chem Separation	Nickel-63	,,,	5		30	70-130	±30	
Rad, α	PuAEA*	Plutonium-238	<del></del>	- 0	1 +	1	70-130	±30	
Rad, α	PuAEA*	Plutonium-239/240	<del></del>	- 0		1	70-130	±30	
Rad	RADSr	Radiogenic strontium	<del></del>			1	70-130	±30	
Rad	Chem Separation Liq Scintillation	Technetium-99	J	5		15	70-130	±30	
Rad	Distillation Liq Separation	Tritium	,	5		400	70-130	±30	
Rad, α	ThAEA	Thorium-232		- o		ī	70-130	±30	
Rad	KPA	Total uranium		lo	2 mg/kg	1 mg/kg	70-130	±30	
Rad, α	UAEA*	Uranium-233/234	3			1	70-130	±30	
Rad	1	Uranium-235/236	7			<u> </u>	70-130	±30	
			<del></del>			1	70-130	±30	
Rad	7	Uranium-238						1	
		Uranium-238			2	<del></del>	<del></del>		
		<u> </u>	Chemicals	, in mg/k		on Limit		·	
Data	Analytical	Inorganic		, in mg/k nary	Detection	n Limit	Accuracy	Precision	
		<u> </u>	Chemicals Prelimi	, in mg/k nary Level	Detection Requirements	ements PQL	Accuracy Required		
Data Type	Analytical	Inorganic	Chemicals Prelimi Action	, in mg/k nary Level	Detection Require	ements			
Data Type Chem	Analytical Method	Inorganic Analyte	Chemicals Prelimi Action Meth C <sup>b</sup>	, in mg/k nary Level Meth B	Detection Requirements	ements PQL	Required	Require	
Data Type Chem	Analytical Method	Inorganic Analyte Arsenic	Prelimi Action Meth C <sup>b</sup>	, in mg/k nary Level Meth B 6.5°	Detection Requirements MDL 2.5/0.20	PQL 10/1 <sup>d</sup>	Required 70-130	Require ±30	
Data Type Chem Chem	Analytical Method EPA 6010 EPA 6010	Inorganic Analyte Arsenic Barium	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup>	, in mg/k nary Level Meth B 6.5°	Detection Requirements MDL 2.5/0.2° 0.1	PQL 10/1ª	70-130 70-130	#30 #30	
Data Type Chem Chem Chem	Analytical Method EPA 6010 EPA 6010 EPA 6010	Analyte Arsenic Barium Beryllium	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup>	mary Level Meth B 6.5° 132de 1.51°	Detection Requirements MDL 2.5/0.2° 0.1 0.03	PQL 10/1 <sup>d</sup> 1 0.2	70-130 70-130 70-130	#30 #30 #30	
Data Type Chem Chem Chem Chem Chem	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010	Analyte Arsenic Barium Beryllium Cadmium	Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 c 1.51 <sup>c</sup> 0.17 <sup>e,j</sup>	, in mg/k nary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,7</sup>	Detection Requirements MDL 2.5/0.2° 0.1 0.03 0.3/0.02°	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup>	70-130 70-130 70-130 70-130	#30 #30 #30 #30 #30	
Data Type Chem Chem Chem Chem Chem Chem	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,7</sup> 36 <sup>e</sup>	mary Level Meth B 6.5° 132de 1.51° 0.17eJ 36°	Detection Requirements 1	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup>	70-130 70-130 70-130 70-130 70-130 70-130	#30 #30 #30 #30 #30 #30	
Data Type Chem Chem Chem Chem Chem Chem Chem	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196	Analyte Arsenic Barium Beryllium Cadmium Chromium (III)	Chemicals Prelim Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>c</sup> 8.0 <sup>l</sup>	mary Level Meth B 6.5° 132° 1.51° 0.17°, 36° 17.5°	Detection Requirements of the control of the contro	PQL 10/1 <sup>d</sup> 1 0.2 0.8/0.04 <sup>d</sup> 1 0.7	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130	#30 ±30 ±30 ±30 ±30 ±30 ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead	Chemicals Prelim Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>c</sup> 8.0 <sup>i</sup> 130 <sup>e</sup>	mary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,7</sup> 36 <sup>e</sup> 17.5 <sup>1</sup> 59.2 <sup>e</sup>	Detection Requirements of the control of the contro	PQL 10/1 <sup>8</sup> 1 0.2 0.8/0.04 <sup>8</sup> 1 0.7 2	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010  EPA 6010  EPA 7471	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>e</sup> 8.0 <sup>i</sup> 130 <sup>e</sup> 353 <sup>c,g</sup> 0.33 <sup>c,e</sup>	mary Level Meth B 6.5° 132° 1.51° 0.17° 36° 17.5° 59.2° 353° 8	Detection Requirements of the control of the contro	PQL 10/1 <sup>d</sup> 1 0.2 0.8/0.04 <sup>d</sup> 1 0.7 2 2 20	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010  EPA 6010  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>d</sup> 8.0 <sup>i</sup> 130 <sup>e</sup> 353 <sup>c,g</sup> 0.33 <sup>c,e</sup> 70 <sup>e</sup>	mary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,f</sup> 36° 17.5° 59.2 <sup>e</sup> 353 <sup>e,g</sup> 0.33 <sup>e,e</sup> 32°	Detection Requirements of the control of the contro	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup> 1 0.7 2 20 0.05 4	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010	Analyte  Arsenic  Barium  Beryllium  Cadmium  Chromium (III)  Hexavalent chromium  Copper  Lead  Mercury  Nickel  Selenium	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>d</sup> 8.0 <sup>l</sup> 130 <sup>e</sup> 353 <sup>c,g</sup> 0.33 <sup>c,e</sup> 70 <sup>e</sup> 5 <sup>e</sup>	mary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,7</sup> 36° 17.5' 59.2 <sup>e</sup> 353 <sup>e,8</sup> 0.33 <sup>e,e</sup> 32° 5°	Detection Requirements of the control of the contro	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup> 1 0.7 2 20 0.05 4 20	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17eJ 36c 8.0c 130c 353cs 0.33cs 70c 5c 10c 10c	mary Level Meth B 6.5° 132° 1.51° 0.17° 36° 17.5° 59.2° 353° 8 0.33° 8 5° 8° 8°	Detection Requirements of the control of the contro	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup> 1 0.7 2 20 0.05 4 20 2	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010	Inorganic  Analyte  Arsenic  Barium  Beryllium  Cadmium  Chromium (III)  Hexavalent chromium  Copper  Lead  Mercury  Nickel  Selenium  Silver  Vanadium	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17eJ 36c 8.0c 130c 353cc 70c 5c 10c 24.5c 10c 24.5c	mary Level Meth B 6.5° 132ª 1.51° 0.17° 36° 17.5° 59.2° 353° 8° 0.33° 8° 8° 11.2°	Detection Requirements of the second Requirement	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 3	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17eJ 36c 8.0c 130c 353ce 0.33ce 70c 5c 10c 24.5c 500c	mary Level Meth B 6.5° 132° 1.51° 0.17° 7 36° 17.5° 59.2° 353° 8 0.33° 8 0.33° 8 11.2° 480°	Detection Requirements (No. 1) (1.5 / 1.5	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 3 2 2	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>c</sup> 8.0 <sup>i</sup> 130 <sup>c</sup> 353 <sup>c,g</sup> 0.33 <sup>c,c</sup> 70 <sup>e</sup> 5 <sup>c</sup> 10 <sup>e</sup> 24.5 <sup>e</sup> 500 <sup>e</sup> 59,500 <sup>h</sup>	mary Level Meth B 6.5° 1324° 1.51° 0.17° 36° 17.51° 59.2° 353° 0.33° 5° 8° 11.2° 480° 27,200°	Detection Requirements of the control of the contro	PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup> 1 0.7 2 20 0.05 4 20 2 3 2 0.5	Required  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130  70-130	### Require  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Sclenium Silver Vanadium Zinc Ammonia Cyanide	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>d</sup> 8.0 <sup>i</sup> 130 <sup>e</sup> 353 <sup>c,g</sup> 0.33 <sup>c,c</sup> 70 <sup>e</sup> 5 <sup>e</sup> 10 <sup>e</sup> 24.5 <sup>e</sup> 500 <sup>e</sup> 59,500 <sup>h</sup> 2.6 <sup>e</sup>	, in mg/k mary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,7</sup> 36° 17.5° 59.2° 353 <sup>e,8</sup> 0.33 <sup>e,6</sup> 32° 5° 8° 11.2° 480° 27,200° 2.6°	Detection Requirements (No. 1) (1.5 / 1.5	ements PQL 10/1 <sup>a</sup> 1 0.2 0.8/0.04 <sup>a</sup> 1 0.7 2 20 0.05 4 20 2 3 2 0.5	Required  70-130	### Requires  ### ### ### ### ### #### #### ########	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 6010  EPA 7196  EPA 6010  EPA 305.1  EPA 9010  EPA 300.0	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride	Chemicals Prelimi Action Meth C <sup>b</sup> 6.5 <sup>c</sup> 245 <sup>c</sup> 1.51 <sup>c</sup> 0.17 <sup>e,j</sup> 36 <sup>c</sup> 8.0 <sup>i</sup> 130 <sup>c</sup> 353 <sup>c,g</sup> 0.33 <sup>c,c</sup> 70 <sup>c</sup> 5 <sup>c</sup> 10 <sup>e</sup> 24.5 <sup>c</sup> 500 <sup>e</sup> 59,500 <sup>h</sup> 2.6 <sup>c</sup> 200	mary Level Meth B 6.5° 132 <sup>d,e</sup> 1.51° 0.17 <sup>e,f</sup> 36° 17.5° 59.2 <sup>2</sup> 353 <sup>c,g</sup> 0.33 <sup>c,e</sup> 32° 5° 8° 11.2° 480° 27,200° 2.6° 96	Detection Requirements of the control of the contro	PQL   10/1 <sup>a</sup>   1   0.2   0.8/0.04 <sup>a</sup>   1   0.7   2   20   0.05   4   20   2   3   2   0.5   1   1   1	Required  70-130	### Require  ### ±30  ### ### ±30  ### ### ±30  ### ### ±30  ### ### ### ±30  ######	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  IEPA 305.1  IEPA 9010  IC 300 modified and 353.1	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17c 36c 8.0c 130c 353c 70c 5c 10c 24.5c 500c 59,500c 2.6c 200 4,400	, in mg/k mary Level Meth B 6.5° 132ª° 1.51° 0.17°, 36° 17.5° 59.2° 353°, 0.33°, 8° 11.2° 480° 27,200° 2.6° 96 4,400	Detection Requirements of the control of the contro	rements  PQL  10/1 <sup>a</sup> 1  0.2  0.8/0.04 <sup>a</sup> 1  0.7  2  20  0.05  4  20  2  1  1  1  1  1  1  1  1  1  1  1  1	Required  70-130	### Require  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  IEPA 305.1  IEPA 9010  IC 300 modified and 353.1  IC 300 modified and 353.1	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate  Nitrite	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17eJ 36c 8.0f 130c 353cs 70c 5c 10e 24.5c 500c 59,500h 2.6f 200 4,400	mary Level Meth B 6.5° 1324° 1.51° 0.17° 36° 17.5° 353° 8° 0.33° 8° 11.2° 480° 27,200° 2.6° 96 4,400	Detection Requirements of the control of the contro	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 3 2 0.5 1 1 0.2 1 1 0.2	Required  70-130	### Require  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  IC 300 modified and 353.11  IC 300 modified and 353.11  EPA 300.0	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate  Nitrite  Sulfate	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17e. 36c 8.0c 130c 353c 70c 5c 10d 24.5c 500c 59,500h 2.6d 200 4,400	mary Level Meth B 6.5° 1324° 1.51° 0.17°, 36° 17.5° 59.2° 353°, 0.33°, 5° 8° 11.2° 480° 27,200° 96 4,400 330	Detection Requirements (No. 1) (1.5 to 1.5 t	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 3 2 0.5 1 1 0.2 1 1 0.2	Required  70-130	### Require  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 305.1  EPA 9010  EPA 305.1  IC 300 modified and 353.1 <sup>1</sup> IC 300 modified and 353.1 <sup>1</sup> EPA 300.0  EPA 300.0  EPA 300.0	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate  Nitrite  Sulfate Phosphate	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17e. 36c 8.0c 130c 353c. 70c 5c 10c 24.5c 500c 59,500h 2.6c 200 4,400 330	mary Level Meth B 6.5° 1324° 1.51° 0.17° 36° 17.51° 59.2° 353° 8° 11.2° 480° 27,200° 2.6° 4,400 330  25,000 N/A°	Detection Requirements (No. 1) (1.5 to 1.5 t	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 1 1 0.2 1 1 0.2 1 1 1 0.2 1 1 1 0 6	Required  70-130	### Require  ### ±30	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  IC 300 modified and 353.11  IC 300 modified and 353.11  EPA 300.0	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate  Nitrite  Sulfate	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17e. 36c 8.0c 130c 353c 70c 5c 10d 24.5c 500c 59,500h 2.6d 200 4,400	mary Level Meth B 6.5° 1324° 1.51° 0.17°, 36° 17.5° 59.2° 353°, 0.33°, 5° 8° 11.2° 480° 27,200° 96 4,400 330	Detection Requirements (No. 1) (1.5 to 1.5 t	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 3 2 0.5 1 1 0.2 1 1 0.2	Required  70-130	### Requires  ### ### ### ### ### #### #### ########	
Data Type Chem Chem Chem Chem Chem Chem Chem Che	Analytical Method  EPA 6010  EPA 305.1  EPA 9010  EPA 305.1  IC 300 modified and 353.1 <sup>1</sup> IC 300 modified and 353.1 <sup>1</sup> EPA 300.0  EPA 300.0  EPA 300.0	Analyte  Arsenic Barium Beryllium Cadmium Chromium (III) Hexavalent chromium Copper Lead Mercury Nickel Selenium Silver Vanadium Zinc Ammonia Cyanide Fluoride Nitrate  Nitrite  Sulfate Phosphate	Chemicals Prelimi Action Meth Cb 6.5c 245c 1.51c 0.17eJ 36c 8.0c 130c 353cc 70c 5c 10c 24.5c 500c 59,500h 2.6c 200 4,400 N/Ac	mary Level Meth B 6.5° 1324° 1.51° 0.17° 36° 17.51° 59.2° 353° 8° 11.2° 480° 27,200° 2.6° 4,400 330  25,000 N/A°	Detection Requirements (No. 1) (1.5 to 1.5 t	PQL 10/18 1 0.2 0.8/0.048 1 0.7 2 20 0.05 4 20 2 1 1 0.2 1 1 0.2 1 1 1 0.2 1 1 1 0 6	Required  70-130	### Requires  ### ±30	

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Require		Accuracy Required	Precision	
Type	Adernoo				MDL	PQL	Keduireu	Required	
Chem	EPA 8260	Acetone	175	80	0.05	0.01	70-130	±30	
# E		Organic	Chemicals,			97			
Data	Analytical Method	Analyte	Prelim Action	Level	Requi	on Limit rements	Accuracy Required	Precision Required	
Type			Meth Cb	Meth B		PQL		Required	
Chem	EPA 8260	1-Butanol (butyl alcohol)	350	160	0.4	1	70-130	±30	
Chem	EPA 8260	2-butanone (MEK)	105	48	0.005	0.01	70-130	±30	
Chem	EPA 8260 as TIC	Butylated hydroxy toluene	N/A	N/A	N/A	N/A	N/A	N/A	
Chem	EPA 8260	Carbon tetrachloride	0.337	0.0337	0.001	0.005	70-130	±30	
Chem	EPA 8260	Chloroform (trichloromethane)	7.17	0.717	0.001	0.005	70-130	±30	
Chem	EPA 8260 as TIC	Decane	N/A	N/A	N/A	N/A	N/A	N/A	
Chem	EPA 8260	Dichloromethane (methylene chloride)	0.5	0.5	0.002	0.005	70-130	±30	
Chem	EPA 8260 as TIC	Ethanol	N/A	N/A	N/A	N/A	70-130	±30	
Chem	EPA 8260	Halogenated hydrocarbons	N/A	N/A	0.002	0.005	70-130	±30	
Chem	EPA 8260 as TIC	Propanol (isopropyl alcohol)	N/A	N/A	N/A	N/A	N/A	N/A	
Chem	EPA 8260	Toluene	100	100	0.001	0.005	70-130	±30	
Chem	EPA 8270	Tributyl phosphate	N/A	N/A	0.4	4	70-130	±30	
Chem	EPA 8260	1,1,1-trichloroethane	20	20	0.001	0.005	70-130	±30	
Chem	EPA 8260	1,1,2-trichloroethane	0.3	0.0768	0.001	0.005	70-130	±30	
Chem	EPA 8080/8082	Polychlorinated biphenyls (PCBs)	66°	0.5	0.01	0.1	70-130	±30	
Chem	NWTPH-Dx modified for kerosene range	Kerosene, normal paraffin hydrocarbon, paraffin, hydrocarbons, shell E-2342 (napthalene and paraffin), soltrol-	N/A	N/A	0.5	5	70-130	±30	
	Anna line in akin a	170 (C <sub>10</sub> H <sub>22</sub> to C <sub>16</sub> H <sub>34</sub> ), purified kerosene, diesel fuel							

NOTE: Detection limits in this table are based on optimal conditions. Interferences and different matrices may significantly degrade the values shown.

Dangerous waste generation is not expected at this OU (a contained-in determination is expected for listed waste hydrazine). If generated, the concentrations of any underlying hazardous constituents will be evaluated against applicable regulatory requirements.

α = alpha analysis

y = gamma analysis

N/A = not applicable

- \* AmAEA, PuAEA, UAEA, NpAEA, ThAEA chemical separation, electro/microprecipitation deposition, alpha energy analysis via Si barrier detector.
- Method C values are based on MTCA industrial standards.

<sup>6</sup> Based on Hanford Site background values.

- <sup>4</sup> First value shown is via routine ICP, second value via "trace" ICP or graphite furnace atomic absorption.
- \* The RESRAD model for the 100 Area remedial design/remedial action or 100-N Area corrective measures study predicts that this constituent will not reach groundwater in 1000 years. It is anticipated that the same will be true in the 200 Areas.

Based on Federal ambient water quality criteria and assumed dilution-attenuation factor of 2.

- The lead value is based on the IEUBK model from EPA (EPA 1994c).
- Ammonia dissolves in the environment and is assumed to not reach groundwater.

<sup>1</sup> Method is from EPA (1984).

There are no preliminary action levels for radionuclides at this time. They will be developed in the remedial investigation/feasibility study GeLi = lithium-drifted germanium detector

HPGe = high-purity germanium

KPA = kinetic phosphorescence analysis

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different for number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

The lab did indeed run the MS/MSD

on the second both of the SDG 5

days ofter these samples were

run. no oms/omso was run with

this both. Attached is a revised

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Chemical and Environmental Measurement Information

#### Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-078

RFW #: 9909L129

SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00

Date Received: 09-17-99

#### **GC/MS VOLATILE**

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-23-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The required holding time for analysis was met.
- 3. Non-target compounds were not detected in the samples.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. Matrix spike analyses for SDG H0534 were performed on RFW# 9909L127, sample ID-B0WBR7.
- 6. The method blank contained the common laboratory contaminant Methylene Chloride and the target compound 2-Butanone at levels less than the CRQL.

J. Michael Taylor

Vice President

Philadelphia Analytical Laboratory

som\group\data\voa\tnu09129.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 12 pages.

01-18-00

Doto

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ERRORS

1) HANG UP OR LINE FAIL

2) BUSY

3) NO ANSWER

4) NO FACSIMILE CONNECTION

BHI Sample Management Phone: (509) 372-9346 FAX: (509) 372-9487

# TO CHARLES THE MENT OF THE SE

To: Bruce Chistian	Fax: 375-5151	
From: Pich West	Date: /-/ 7-68	
Re: 10 534	Pages: 5	
CC:	1	
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DHERE

BHI Sample Management Phone: (509) 372-9346 FAX: (509) 372-9487

# accimiletransmittal

To: Bruce Chistian	Fax: 375-515/	
From: Rich West	Date: /- / 8- 68	
Re: 10 534	Pages: 5	
cc:		
Quick Turn / Priority Data	☐ Final Data Package	

DHarld

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management 3190 George Washington Way

MSIN: H9-03 Phone: 375-9439 FAX: 372-9487

# **BHI Sample** Management

# Fax

To: £	Ruce	Clue	istian	From:	Jeaneth	Duncan
Fax:	375-	5151		Pages		
Phone:				Date:	1/10/00	
Re:				CC:		
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